



Lower Thames Crossing Ground Investigations

Report on Archaeological and Geoarchaeological Monitoring of Phase 3 Ground Investigations

AECOM Limited

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Summary

This document reports on the archaeological and geoarchaeological monitoring of LTC Phase 3 Ground Investigations (GI). This monitoring was carried out in compliance with the requirements set out by LTC in A Technical Specification for the Geoarchaeological and Palaeoenvironmental Mitigation of Geotechnical Ground Investigation (HE540039-CJV-GEN-GEN-SPE-GEO-00068), Ground Investigation Specification Land Based Works – Phase 3 (HE540039-CJV-GEN-GEN-SPE-GEO-00101) and the requirements set out in the Written Scheme of Investigation for Archaeological Monitoring and Geoarchaeological Investigations (HE540039-PCI-GEN-GEN-REP-GEO-00102).

In addition to monitoring the impact of the GI works themselves upon any archaeological remains, the monitoring programme was designed to inform assessment of the archaeological and geoarchaeological potential of Quaternary deposits within the LTC scheme, specifically of those deposits which were encountered during GI works. The report integrates the results of Phase 3 GI monitoring with those from archaeological and geoarchaeological monitoring of Phase 2 GI (HE540039-PCI-VGT-GEN-REP-GEO-00027, HE540039-PCI-GEN-GEN-REP-GEO-00109 – 00112) and provides recommendations for palaeoenvironmental assessment of samples taken from both phases of monitoring.

To highlight the geoarchaeological potential of the Quaternary deposits present within the scheme boundary, the results of the Phase 2 and Phase 3 GI monitoring are framed within 34 Palaeolithic and Quaternary (PQ) zones identified within an initial scheme wide Palaeolithic and Quaternary Deposits Model (PQDM) (Wenban-Smith and Bates 2000). The results of the GI monitoring will enable the PQDM to be updated.

No significant archaeological evidence was identified during monitoring of Phase 2 or Phase 3 GI. However, geoarchaeological monitoring has added to and refined existing knowledge and understanding of the Pleistocene and Holocene sediments and their geoarchaeological potential. Monitoring has also allowed palaeoenvironmental samples suitable for assessment to be recovered from key deposits.

Through monitoring in the field, at a logging facility and review of GI logs, sedimentary sequences from 860 Phase 2 and 3 GI interventions have been assessed. Stratigraphic interpretations from all interventions have been provided, allowing Pleistocene and Holocene sequences across much of the proposed scheme to be defined. The updated, integrated record of the Quaternary deposits encountered during GI has been entered into Rockworks™ v17.0. Modelled cross-sections through key deposits within PQ zones have been produced. A database containing lithological descriptions and stratigraphic interpretations for all GIs is also provided.

Key outcomes of the geoarchaeological monitoring are:

- Discovery north of the Thames of extensive fluvial sequences belonging to the Ockendon Channel (Gibbard 1994). These comprised low energy silts and clays, which included organic units. The channel deposits are interglacial deposits and are part of the Lynch Hill/Corbets Tey terrace of the River Thames (MIS 10-9-8; 364–244 Ka). The GI data has allowed the course of this channel within the scheme boundary to be mapped. The channel deposits have high palaeoenvironmental potential, whilst the Palaeolithic archaeological potential of these deposits is similarly high. Samples suitable for palaeoenvironmental assessment have been taken.
- Identification, north and south of the Thames, of previously unrecorded Pleistocene silts and clays beneath Holocene alluvial deposits. These well stratified, fine grained, frequently laminated sediments are likely estuarine and/or fine grained fluvial deposits. North of the Thames these deposits are bracketed by Head. The age of the silts and clays is unknown. However, their position within the wider Pleistocene stratigraphy indicates broad correlation with the East Tilbury Marshes terrace (late MIS 6 and early MIS 2; 160–25 Ka). The silts and clays contained organic units and have high palaeoenvironmental potential; suitable samples for assessment were taken.
- Recording of extensive Holocene alluvial sequences within the Thames floodplain. These contain peats which likely extend in date from the early to mid-Holocene; these peats have significant palaeoenvironmental potential. More limited occurrences of peat were identified in the Mar Dyke.

Pleistocene and Holocene deposits were identified and sampled during Phase 2 and 3 GI monitoring which have significant potential to preserve palaeoenvironmental remains, including molluscs, plant macro-fossil and microfossils (including pollen, ostracods, diatoms and foraminifera). Assessment of these samples is recommended. The results will inform the need for and scope of subsequent analysis and help to target and refine further specific geoarchaeological field investigations. Assessment should focus on key deposits with the highest geoarchaeological potential to preserve palaeoenvironmental remains and material suitable for scientific

dating, focusing on those samples with the highest stratigraphic integrity. Selected samples which fulfil these criteria are outlined.

1. Introduction

Project description

- 1.1 Highways England (the Client) is proposing a new road crossing, known as the Lower Thames Crossing (LTC), connecting Essex and Kent that will ease congestion at the existing Dartford Crossing and support growth plans in Essex and Kent. A new dual carriageway running on embankments and in cuttings is proposed between the M25 in South Ockendon in the north and the A2 in Cobham in the south. Widening of local roads and the construction of new structures are also proposed under the scheme. LTC\Cascade are the Principal Designer for the scheme.
- 1.2 Three Phases Ground Investigation (GI) works have been carried out to obtain information for the management of ground uncertainties and risks relevant to the scheme. Perfect Circle Joint Venture (PCJV) were appointed as the Principal Contractor for the Phase 2 and Phase 3 GI works. PCJV is a joint venture initiative comprising of Pick Everard, AECOM Limited and Gleeds. The Principal Contractor role within the Lower Thames Crossing Project will be carried out utilising AECOM personnel and specialist sub-contractors.
- 1.3 The Phase 2 and 3 GI was undertaken by suitably qualified Ground Investigation contractor (the GI contractor) appointed by PCJV. Archaeological and geoarchaeological monitoring of these GI works was required. This monitoring was carried out by Wessex Archaeology (the Archaeological Sub-contractor) appointed by AECOM.

Site and GI works description

- 1.4 The Phase 3 GI works were separated into different geographic work packages based upon four survey areas (labelled Work Packages A3–D3); their locations are outlined in Figure 1. The packages cover a corridor that crosses the Lower Thames Estuary, representing distinct geographic and geological zones. Information relating to individual packages is summarized below.

Package A3

- 1.5 Package A3 included all GI works south of the River Thames and extends from the edge of the river in the north to the proposed LTC junction with the A2 in the south, to the east of Gravesend, Kent. Further GI works were located to the east and west along the A2. The northern section of the package falls within reclaimed marshlands, while to the south the land rises gently towards the North Downs. The package covers land that is largely agricultural. The Phase 3 GI interventions within Package A3 are listed in Table 1.

Table 1 – Package A3 GI Works

Type on intervention	Number
Cable percussion boreholes	7
Cable percussion with rotary follow-on boreholes	32
Dynamic sampler with rotary follow-on boreholes	8
Rotary boreholes	17
Sonic boreholes	17
Windowless sampling boreholes	22
Trial Pits	4

Package B3

- 1.6 Package B3 is located on the north bank of the River Thames and is bound by the river at the south and by fields to the south of the A13 at the north. The southern half, south of the London, Tilbury and the Southend Railway Line, is located within the Tilbury Marsh which has been reclaimed for agricultural use

and/or used as historic and modern authorised landfills. The northern half of Package B3 rises sharply from the lower Thames Valley floor to the upper valley terraces. The area has been subjected to extensive mineral extraction. The area is framed by the rural settlements of East Tilbury to the east and Orsett to the north, and the larger suburban London commuter settlements of Chadwell St Mary and Grays to the west. The Phase 3 GI interventions within Package B3 are listed in Table 2

Table 2 – Package B3 GI Works

Type on intervention	Number
Cable percussion boreholes	27
Cable percussion with rotary follow-on boreholes	18
Dynamic sampler with rotary follow-on boreholes	2
Rotary boreholes	2
Windowless sampling boreholes	5
Trial Pits	13

Package C3

- 1.7 Package C3 is north of Package B3. Its southern boundary extends just south of the A13 and reaches the eastern side of the Mar Dyke to the north. Here the area rises sharply from the lower Thames Valley floor to the upper valley margins. The Mar Dyke valley itself consists of reclaimed marshland now under cultivation. The Package area is framed by the rural settlements of Orsett to the east, and the larger suburban London commuter settlements of Chadwell St Mary to the south-west. The Phase 3 GI interventions within Package C3 are listed in Table 3

Table 3 – Package C3 GI Works

Type on intervention	Number
Cable percussion boreholes	27
Cable percussion with rotary follow-on boreholes	39
Dynamic sampler with rotary follow-on boreholes	34
Windowless sampling boreholes	15
Trial Pits	15

Package D3

- 1.8 Package D3, at the north end of the GI transect, extends west from the Mar Dyke and joins the M25 north-west of South Ockendon. A number of GI works were also located along the M25 to the junction with the A127 and Great Warley. The area is largely agricultural with occasional areas of reinstated land following mineral extraction. The Mar Dyke valley itself is composed of reclaimed marshland now under cultivation. The Phase 3 GI interventions within Package D3 are listed in Table 4

Table 4 – Package D3 GI Works

Type on intervention	Number
Cable percussion boreholes	35
Cable percussion with rotary follow-on boreholes	4
Dynamic sampler with rotary follow-on boreholes	76
Windowless sampling boreholes	39
Trial Pits	12

Document scope

- 1.9 This document reports on the archaeological and geoarchaeological monitoring of all Phase 3 GI works across all four work packages. This monitoring was carried out in compliance with the requirements set out by LTC in A Technical Specification for the Geoarchaeological and Palaeoenvironmental Mitigation of Geotechnical Ground Investigation (HE540039-CJV-GEN-GEN-SPE-GEO-00068), Ground Investigation Specification Land Based Works – Phase 3 (HE540039-CJV-GEN-GEN-SPE-GEO-00101) and the requirements set out in the Written Scheme of Investigation for Archaeological Monitoring and Geoarchaeological Investigations (HE540039-PCI-GEN-GEN-REP-GEO-00102).
- 1.10 This monitoring was designed to aid assessment of the archaeological and geoarchaeological potential of the landscape within the route, specifically of Quaternary deposits which were encountered during GI works. The reporting integrates the results of Phase 3 GI monitoring with those from archaeological and geoarchaeological monitoring of Phase 2 GI (HE540039-PCI-VGT-GEN-REP-GEO-00027, HE540039-PCI-GEN-GEN-REP-GEO-00109 – 00112) and provides recommendations for palaeoenvironmental assessment of samples taken from both phases of monitoring.
- 1.11 In format and content, this document conforms to current best practice, LTC A Technical Specification for the Geoarchaeological and Palaeoenvironmental Mitigation of Geotechnical Ground Investigation (HE540039-CJV-GEN-GEN-SPE-GEO-00068), as well as to the guidance in Management of Research Projects in the Historic Environment (MoRPHE, Historic England 2015a), the Chartered Institute for Archaeologists' (CIfA) Standard and guidance for archaeological field evaluation (CIfA 2014) and Historic England's technical guide to Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record (Historic England 2015b).

2. Overarching aims and objectives

Introduction

- 2.1 As outlined in the Written Scheme of Investigation for Archaeological Monitoring and Geoarchaeological Investigations (HE540039-PCI-GEN-GEN-REP-GEO-00102), the general aim of the GI monitoring was to mitigate the impact of these works on the archaeological and geoarchaeological resource through archaeological and geoarchaeological monitoring, palaeoenvironmental sampling, and recording.
- 2.2 The overarching aims and objectives of archaeological monitoring and geoarchaeological investigations are summarised below

Overarching aims

- 2.3 The general overarching aims of the archaeological monitoring and geoarchaeological monitoring were:
 - to identify and record any archaeological features, material or deposits within the selected GI,
 - to minimise or mitigate impact to significant archaeological remains identified through avoidance or detailed recording;
 - to assess the depth of topsoil and subsoil overlying deposits within which archaeological remains may occur;
 - to record and assess the depositional processes associated with Quaternary deposits within selected GI interventions;
 - to assess the potential for Quaternary deposits within selected interventions to preserve organic remains and palaeoenvironmental evidence;
 - to retrieve dating evidence for Quaternary deposits where possible and relevant;
 - to inform the baseline evidence for any environmental impact assessment that would be carried out for the proposed Lower Thames Crossing; and
 - to provide information that may assist in development of an appropriate archaeological strategy as the Lower Thames Crossing project develops.

Overarching objectives

- 2.1 The general overarching objectives of the archaeological monitoring and geoarchaeological monitoring were:
 - to make a record of Quaternary deposits with archaeological and geoarchaeological potential identified by exploratory excavations and boreholes in order to develop a deposit model;
 - to ascertain the depths and locations of Quaternary deposits which have the potential to contain palaeoenvironmental remains, or to preserve significant archaeological evidence;
 - where possible, retrieve samples from Quaternary deposits for palaeoenvironmental assessment;
 - to establish the chrono-stratigraphic relationship between Holocene and Pleistocene deposits within the scheme boundary, and their relationships with deposits within the wider Lower Thames Valley, and
 - delimit areas and Quaternary deposits with varying archaeological and geoarchaeological potential within the scheme boundary.

3. Geoarchaeological Background

Introduction

- 3.1 Archaeological and geoarchaeological background information on deposits potentially present within Phase 3 GI areas were assessed as part of a Geoarchaeological Desk-based Assessment (GDBA) which forms an addendum to the Phase 2 GI WSI (HE540039-PCI-GEN-GEN-REP-GEO-00054), the Phase 3 GI (HE540039-PCI-GEN-GEN-REP-GEO-00102) and an initial Palaeolithic and Quaternary Deposit Model (PQDM; Wenban-Smith and Bates 2020). Relevant information on the Quaternary archaeological and geoarchaeological resource for the Phase 3 GI areas is summarized below.
- 3.2 Where age estimates are available these are expressed in millions of years (MA), thousands of years (Ka) and within the Holocene epoch as either years Before Present (BP), Before Christ (BC) and Anno Domini (AD).

Solid Geology

- 3.3 The solid geology (also termed by the British Geological Survey 'BGS' as bedrock geology) is the mass of rocks forming the Earth and the parent material from which the superficial geological sediments (excluding those formed from plant material such as peat) and soils are variously derived. The solid geological strata therefore account for some of the variability in characteristics of the superficial sediment and soils recorded along the scheme.
- 3.4 The Phase 3 work packages cross a series of geological strata of progressively older age from north to south (23–299 MA), comprising rocks of Paleogene (49–59 MA) and Cretaceous (72–94 MA) date (Figure 2).
- 3.5 The southern part of the scheme (Work Packages A3 and B3) crosses Cretaceous deposits of the Seaford Chalk and Newhaven Chalk Formations (72–94 MA), overlain in places with Palaeogene sands and clays of the Thanet Formation (56–59 MA). Further north (Work Packages C3 and D3) the underlying solid geology is dominated by Palaeogene deposits of the Thanet Formation (56–59 MA), the Lambeth Group (55-56 MA) and London Clay Formation (56–49 MA).

Superficial Deposits

- 3.6 The superficial geology mapped by the British Geological Survey (BGS) within the Phase 3 work packages is illustrated in Figure 3. The superficial geology along the scheme covers the last 450,000 years of geological time, extending across the Middle (781–126 Ka) and Late Pleistocene (126–11.7 Ka) and Holocene (11.7 Ka–present) epochs. Together these epochs form part of the Quaternary, a period covering the last 2.588 MA, and defined by repeated fluctuations between cold (glacial) and warm (interglacial) climate stages (Table 5). These cold and warm climate stages are subdivided into Marine Isotope Stages (MIS) where odd numbers indicate an interglacial period and even numbers a glacial period

Table 5 – British glacial and interglacial chronostratigraphy

Geological Period	Chronostratigraphy		Age (Ka)	Marine Isotope Stage (MIS)
Holocene	Holocene		11.7 – present	1
Late Pleistocene	Devensian	Loch Lomond Stadial	11.7 – 12.9	2 – 5d
		Windermere Interstadial	12.9 – 15	
		Dimlington Stadial	15 – 26	
		Upton Warren Interstadial	40 – 43	
	Early Devensian	60 – 110		
	Ipswichian		115 – 130	5e
Middle Pleistocene		Unnamed cold stage	130 – 191	6
		Aveley interglacial	191 – 243	7
		Unnamed cold stage	243 – 300	8
		Purfleet interglacial	300 – 337	9

	Unnamed cold stage	337 – 374	10
	Hoxnian	374 – 424	11
	Anglian	424 – 478	12

- 3.7 Cold stages saw the spread of ice sheets over significant portions of the European continental shelf, retreating during intervening warm stages, characterised by evidence for the development of deciduous woodland. Warmer episodes during glaciations where there is evidence for the development of boreal woodland or herbaceous plant communities are classified as 'interstadials', typically separated by episodes of severe cold termed 'stadials'. Interglacial stages also include evidence for major climatic fluctuation, most clearly represented in the current Holocene Epoch by the warmer Medieval Climate Anomaly and ensuing Little Ice Age.
- 3.8 The superficial geological deposits present across scheme chiefly reflect the influence of periglacial, riverine and estuarine processes occurring during successive cold and warm stages. The key superficial deposits recorded across the scheme are summarised below.

Fluvial Sands and Gravels

- 3.9 The superficial geology across the scheme is dominated by deposits of the River Thames. These form part of the Lower Thames terrace sequence. This constitutes one of the most complete geological records of the last 500,000 years, within which internationally significant Palaeolithic archaeological records are preserved, along with associated geoarchaeological evidence of palaeoenvironmental and landscape change.
- 3.10 The Lower Thames terrace deposits represent former floodplain deposits of Middle–Late Pleistocene date preserved along the sides of current and former river valley. Evidence for several Fluvial Sands and Gravels have been mapped, representing successive phases of aggradation and incision covering multiple glacial and interglacial cycles.
- 3.11 Sediment deposition is closely linked to climate. Deposits include coarse grained fluvial sands and gravels and solifluction deposits laid down during cold stages, and fine grained organic rich units formed during interglacial and interstadial phases. Terrace formation is argued to occur during episodes of incision and erosion influenced by climatic conditions and crustal warping; it is hypothesised to occur at both warming and cooling transitions, creating step-like 'terrace' sequences of sediments (Bridgland 2006).
- 3.12 The Lower Thames terraces have been extensively studied. Up to six terrace formations can be recognised, all of which may be present within the scheme. These terraces incorporate cold climate solifluction deposits and fluvial sands and gravels together with interglacial fluvial sediments, generally finer grained and often fossiliferous.
- 3.13 The current chronostratigraphic framework for the Lower Thames terraces (after Bridgland 2006 but see also Gibbard 1994) is summarized in Table 6.

Table 6 – Chronostratigraphic framework for Lower Thames terraces

Terrace	Units	Climate	Ages	MIS
Shepperton	Tilbury Alluvial Deposits	Warm	Holocene	1
	Shepperton Gravel	Cold	Devensian	2
Kempton Park/East Tilbury Marshes	East Tilbury Marshes Upper Gravel	Cold	Devensian	5d-2
	Trafalgar Square deposits	Warm	Ipswichian	5e
	East Tilbury Marshes Upper Gravel	Cold		6
Taplow/Mucking	Mucking Upper Gravel	Cold		6
	Aveley Silts and Sands	Warm		7
	Mucking Lower Gravel	Cold		8
Lynch Hill/Corbets Tey	Corbets Tey Upper Gravel	Cold		8
	Purfleet Silts and Sands	Warm		9

	Corbets Tey Lower Gravel	Cold		10
Boyn Hill/Orsett Heath	Orsett Heath Upper Gravel	Cold		10
	Swanscombe interglacial deposits	Warm	Hoxnian	11
	Orsett Heath Lower Gravel	Cold	Late Anglian	12
	Black Park Gravel	Cold	Late Anglian	12
	Hornchurch Till	Cold	Anglian	12

3.14 These terraces are composed of a variety of deposits reflecting a range of depositional environments. The key named units known to be present within the vicinity of the LTC route are summarized in Table 7.

Table 7 – Summary of Lower Thames terraces in the study area

	Terrace	Unit
Lower Thames Terraces	Shepperton Terrace	Tilbury alluvial deposits
		Shepperton Gravel
	Kempton Park / East Tilbury Marshes Terrace	East Tilbury Marshes Upper Gravel Trafalgar Square Deposits East Tilbury Marshes Lower Gravel
	Taplow / Mucking Terrace	West Thurrock Gravel Aveley Silts and Sands Crayford Gravel
	Lynch Hill / Corbets Tey Terrace	Grays 'brickearth' Botany Gravel Purfleet Silts and Sands Little Thurrock Gravel
	Boyn Hill / Orsett Heath Terrace	Swanscombe deposits Orsett Heath Gravel
		?Black Park Gravel

Black Park Gravel

3.15 The route passes in close proximity to deposits mapped by the BGS as Black Park terrace; these are the Black Park Gravel of Gibbard (1994). Upstream, in the Middle Thames, the Black Park terrace is thought to have aggraded during the late Anglian (450–424 Ka). Within the Middle Thames Black Park terrace deposits have produced important Lower Palaeolithic archaeological assemblages (Wymer 1961, Roe 1968, Bridgland 1994a). Palaeolithic artefacts are recorded from deposits mapped as Black Park terrace in the vicinity of the route (Wymer 1985; 1999, Wenban-Smith and Bates 2020).

3.16 The presence of the Black Park Gravel as part of aggradation which is separate from the Boyn Hill/Corbets Tey terrace is disputed. It is based on the assertion that the Black Park Gravel north of the Thames and the Dartford Heath Gravel south of the Thames predate the Boyn Hill/Orsett Heath terrace (Gibbard 1994). However, it has been argued that deposits mapped as Black Park and Dartford Heath Gravels form part of the Boyn Hill/Orsett Heath terrace (Bridgland 1994b; 2006).

3.17 Deposits mapped as Black Park terrace are found within and adjacent to Packages C3 and D3.

Boyn Hill/Orsett Heath terrace

3.18 The Boyn Hill/Orsett Heath terrace is thought to have aggraded between late MIS 12 and MIS 10 (450–337 Ka). The terrace incorporates sands and gravels generally reflecting deposition under cold climatic conditions and interglacial sediments, which are generally finer grained.

3.19 Within the Lower Thames region, the deposits of the Boyn Hill/Orsett Heath terrace are associated with a rich Lower Palaeolithic archaeological record and, in places, preserve palaeoenvironmental datasets. The most notable and well-studied exposures of the Boyn Hill/Orsett Heath in the wider area are located around Swanscombe, Greenhithe and Dartford Heath in Kent. Of particular significance are the deposits at Barnfield Pit, Swanscombe where an early human fossil skull, extensive Lower Palaeolithic

archaeological assemblages and wide-ranging palaeoenvironmental datasets have been recovered (Conway et al. 1996, Wenban-Smith and Bridgland 2001).

- 3.20 No mapped exposures of the Boyn Hill/Orsett Heath terrace are located within or adjacent to the route south of the Thames (Package A3). However, extensive spreads of the same terrace are mapped to the north of the Thames within Packages C3 and D3. These deposits have been subject to comparatively little detailed previous investigations but have produced significant numbers of Lower Palaeolithic artefacts (Wymer 1985; 1999, Wenban-Smith and Bates 2020).

Lynch Hill/Corbets Tey terrace

- 3.21 The Lynch Hill/Corbets Tey terrace is thought to have aggraded between MIS 10 and MIS 8 (364–244 Ka). Cold stage fluvial sands and gravels and finer grained interglacial deposits are well known from this terrace; the latter is often referred to as ‘brickearth’.
- 3.22 Areas mapped as the Lynch Hill/Corbets Tey terrace are present within Packages A3, B3 and D3. Although Palaeolithic artefacts have been recovered from areas where these deposits are mapped within and adjacent to the scheme (Wymer 1985; 1999, Wenban-Smith and Bates 2020) these specific areas have been subject to little previous research. However, broadly equivalent deposits in adjacent areas have been investigated, most notably at Globe Pit, Little Thurrock (Bridgland 1988, 1994c), Purfleet (Wymer 1985, Schreve et al. 2002, Scott 2011, Bridgland et al. 2013) and Belhus Park (Wymer 1985, Schreve 1997). These locations have produced significant late Lower/early Middle Palaeolithic archaeology (Wymer 1985, 1999, Bridgland 1994a, Scott 2011, Scott et al. 2011).
- 3.23 Globe Pit is located 4 km west of Package B3 and is the source of important Lower Palaeolithic archaeology (Wymer 1985, Bridgland 1994c). The bulk of the archaeology is associated with fluvial sands and gravels, which are overlain by fine-grained fluvial ‘brickearth’ deposits (Bridgland 1994c). The deposits at Globe Pit are mapped by the BGS as ‘Taplow Gravel Member’ but have been shown to be part of the Lynch Hill/Corbets Tey terrace (Bridgland 1988, Gibbard 1988). The Lower Palaeolithic artefacts from here are generally unabraded and are interpreted as reflecting early human activity within the immediate vicinity that has been incorporated into the feather edge of the Corbets Tey Gravel (Wymer 1957, 1985, Snelling 1964, Bridgland and Harding 1993, Bridgland 1994c). The assemblage lacks handaxes and has been characterised as a ‘Clactonian’ assemblage (Wymer 1957, 1985, Snelling 1964, Bridgland and Harding 1993).
- 3.24 The Clactonian is characterised as a Lower Palaeolithic assemblage defined by an absence of handaxes. They have been suggested to have cultural, behavioural and/or chronological significance (Wymer 1974, Wenban-Smith 1998; 2013, White 2000, White and Schreve 2000). Such assemblages are well attested to in the Lower Thames where they are found within the earlier part of the Boyn Hill/Orsett Heath terrace, most notably at Barnfield Pit (Ovey 1964, Conway et al 1996) and Southfleet Road (Wenban-Smith 2013), Swanscombe, Kent and Clacton, Essex (Oakley and Leakey 1937, Singer et al. 1973). The presence of similar assemblages seemingly lacking handaxes apparently associated with younger Lynch Hill/Corbets Tey, principally at Globe Pit, has been suggested to indicate a second, chronologically distinct period associated with Clactonian archaeology (White 2000, White and Schreve 2000). However, these younger ‘Clactonian’ assemblages are much less clearly contextualised and chronostratigraphically constrained than the earlier material.
- 3.25 The Lynch Hill/Corbets Tey deposits in the Grays area are associated with extensive ‘brickearth’ deposits. These consist of well bedded, often laminated fluvial silts, sands and clays (West 1969, Hollin 1977). From the 1830s onwards these yielded vertebrate remains, molluscs, ostracods, plant remains and occasional artefacts (Hinton and Kennard 1900, Wymer 1985, West 1969, Hollin 1977, Bridgland 1994c)
- 3.26 Deposits at Purfleet, located ~5 km south of the route, have produced Lower and Middle Palaeolithic artefacts (Wymer 1968, 1985, Palmer 1975, Schreve et al. 2002, Scott 2011, Scott et al. 2011, Bridgland et al. 2013). This includes some of the earliest evidence of Levallois flaking in Britain, a technique of producing lithic artefacts that is seen to mark the transition to the Middle Palaeolithic and key to understanding Palaeolithic national and regional settlement history (White and Ashton 2003). The Purfleet deposits have also produced significant palaeoenvironmental assemblages, most notably from the lower part of the sequences. This material is indicative of interglacial conditions and includes rich molluscan faunas, ostracod and pollen together with mammal bones including straight-tusked elephant, bison and small mammal remains (Snelling 1975, Schreve et al 2002). Although these deposits have previously been associated with the Mar Dyke (Dewey et al. 1924, Palmer 1975), a tributary of the River Thames,

more recent work has demonstrated that they belong to the Lynch Hill/Corbets Tey terrace and are within an abandoned loop of the main Lower Thames Valley (Bridgland 1994d, Penkman et al 2011).

- 3.27 At Belhus Park, in a location 2.6 km south-west of the Package D3 western boundaries, an organic clay overlain and underlain by fluvial sands and gravels was identified. The lower gravel and the organic clays have produced plant macrofossils, molluscs and vertebrate remains (Schreve 1997), whilst the overlying gravels have produced Lower Palaeolithic artefacts, some in very fresh condition indicating minimal post-depositional reworking (Wymer 1985). Similarly, eight handaxes are known from Gerpins Gravel Pit, located 1.5 km west of Package D, where organic deposits beneath fluvial sands and gravels have been identified (Wymer 1985).

Taplow/Mucking terrace

- 3.28 The Taplow/Mucking terrace is thought to have aggraded between MIS 8 and MIS 6 (300–123 Ka). Units can include coarse fluvial sands and gravels, generally deposited under cold climatic conditions, and interglacial sediments; the interglacial deposits in particular are associated with significant palaeoenvironmental sequences (Schreve 1997; 2001). Deposits of the terrace contain both minimally disturbed early Middle Palaeolithic archaeology and associated palaeoenvironmental datasets, along with reworked Lower Palaeolithic and Middle Palaeolithic artefacts (Wymer 1985, Bridgland and Harding 1994, Schreve et al. 2006, Scott 2011).
- 3.29 Limited exposures of the Taplow/Mucking terrace are mapped south of the Thames within Package A3, whilst major mapped occurrences are present to the north in Packages C3 and B3. The exposures south of the Thames have undergone little previous investigation, however, those to the north have been the subject of considerable research. Key sites are found at Lion Pit, West Thurrock and several locations in the Aveley area.
- 3.30 Lion Pit is located 6 km west of Package B3. Here, an early Middle Palaeolithic archaeological assemblage was recovered from fluvial deposits which were banked up against the chalk. The archaeology was associated with a basal gravel (Bridgland and Harding 1994) overlain by fossiliferous sands and silts; the latter has produced vertebrates, plant macrofossils and pollen indicative of fully interglacial conditions (Schreve et al. 2006). The archaeology is generally in fresh condition and is regarded to reflect minimally disturbed early Middle Palaeolithic human activity on the banks and bars of a river, immediately adjacent to a chalk cliff (Scott 2011).
- 3.31 At Aveley there are a number of locations associated with highly significant palaeoenvironmental datasets, most notable at Moor Hall Farm Pit (located 4 km south-west of Package D3) and Sandy Lane Quarry (4.7 km south-west of Package D3) where extensive vertebrate remains have been recovered within a complex sequence of silts, clays, sands and gravels which have been correlated with the Taplow/Mucking terrace (Bridgland 1994e, Schreve 2001, Penkman et al. 2011). This includes a partial skeleton of a mammoth from Moor Hall Farm, along with a slightly disarticulated skeleton of a mammoth and a partial skeleton of a straight tusked elephant from Sandy Lane; all were recovered from organic clays. Pollen, plant macrofossils, insect, mollusc and other vertebrate remains were recovered from the terrace deposits at these locations, whilst further material was recovered from equivalent deposits during road improvement works for the A13 (Schreve 1997). A small number of Palaeolithic artefacts are also reported from Aveley (Scott 2011, 186).

Kempton Park/East Tilbury Marshes terrace

- 3.32 Beneath Holocene alluvium within the modern Thames floodplain deposits of the Kempton Park/East Tilbury Marshes terrace and the Shepperton gravel are known to be present; they occur at increasing depth below ground level towards the centre of the floodplain.
- 3.33 The East Tilbury Marshes terrace is thought to have aggraded between late MIS 6 and early MIS 2 (160–25 Ka); it has the broad potential to contain late Middle and early Upper Palaeolithic archaeological material, along with Ipswichian (MIS 5e; 123–110 Ka) and/or Devensian (MIS 5d–2; 110–30 Ka) geoarchaeological and palaeoenvironmental datasets. Specifically, the East Tilbury Marshes terrace is known to contain Ipswichian (MIS 5e) deposits associated with a wide range of palaeoenvironmental dataset, including key nationally important faunal assemblages (Franks 1960, Preece 1999).
- 3.34 Quarrying in the East Tilbury Marshes area has demonstrated sands and gravels laid down by a braided river (Gibbard 1994). Primarily encountered in boreholes, it is overlain by a Holocene sequence reaching up to 22m in thickness. Notably two handaxes have been recovered from Tilbury docks which are typologically late Middle Palaeolithic (60–34 Ka), one of which is in fresh condition indicative of minimal

post-depositional disturbance (Wymer 1985, Tyldesley 1987). These are likely to derive from the deposits of Kempton Park/East Tilbury Marshes and demonstrate their potential to preserve late Middle Palaeolithic archaeology.

Shepperton Gravel

- 3.35 The Shepperton gravel is thought to represent the final phase of Pleistocene fluvial deposition associated with the River Thames in the late Devensian (17–12 Ka). In the scheme boundary borehole data demonstrates that it is overlain by a considerable sequence of Holocene alluvial and estuarine deposits which are up to 16 m thick in places. Due to their significant depth beneath the floodplain the Shepperton gravel has been subject to limited investigation but is characterised as fluvial sands and gravels laid down in a braided river environment under cold climate conditions (Gibbard 1994).
- 3.36 A key context for Late to Final Upper Palaeolithic and early Mesolithic archaeology in the wider area is surface and deposits immediately overlying the Shepperton Gravel (Bates and Stafford 2013). The gravels themselves may contain Palaeolithic archaeology, and fossiliferous organic deposits with palaeoenvironmental potential.

Head

- 3.37 Head deposits occur sporadically across of the scheme. Deposits mapped as Head can be formed through different processes and can include aeolian, alluvial, colluvial and soliflucted material. Such sequences can encompass units deposited during more than one period of the Pleistocene and can include Holocene colluvium. These deposits may also contain eroded and redeposited artefacts and seal underlying stratigraphy in the form of buried former Pleistocene landsurfaces; these can be associated with minimally disturbed Palaeolithic archaeology and palaeoenvironmental remains.
- 3.38 The archaeological and geoarchaeological potential of deposits mapped as Head along the route is poorly understood. Earlier Palaeolithic artefacts are known from the chalk downlands with dry valleys containing deposits mapped as Head which extend across the southern part of Package A3 (Wenban-Smith and Bates 2020).
- 3.39 Although the specific contextual associations of these artefacts are unclear, they indicate potential for earlier Palaeolithic material to be preserved within contexts mapped as Head. Additionally, the presence of Palaeolithic artefacts within chalk upland areas lacking mapped Pleistocene deposits may indicate potential for localised depositional capture points containing Pleistocene sediments. These could include dolines and other solution features which can preserve Pleistocene deposits and Lower and Middle Palaeolithic archaeology (Cook and Killick 1924, Parfitt and Halliwell 1996, Bailiff et al. 2013).

Loess

- 3.40 Loess is a silt-sized wind-blown sediment transported in periglacial conditions close to the margins of ice sheets (Antoine et al. 2003). Loess is present widely across southern England where it reaches a maximum thickness of 4m at Pegwell Bay, East Kent (Pilcher et al. 1954, Antoine et al. 2003). The most well-known English loess sequences are found in Kent and Sussex where they date to the Late Devensian (MIS 2) between 18.8 to 14.6 Ka (Parks and Rendell 1992, Bateman 1998). Older loess deposits, principally dated to MIS 6 and MIS 12, are also known in southern England, however.
- 3.41 No deposits specifically mapped as loess are present in areas with or adjacent scheme. However, 'brickearth' deposits associated with the Thames terraces and deposits mapped as Head could include aeolian components. Primary loess is directly laid down as windblown sediments. This can be subsequently reworked downslope by colluvial processes. In both instances these deposits can contain or bury stabilisation horizons (which can be associated with soil formation) that may be associated with minimally disturbed Palaeolithic archaeology and palaeoenvironmental evidence.

Till

- 3.42 Tills are poorly sorted sediments deposited sub-glacially by ice sheets. No till deposits are mapped within or immediately adjacent to the route. However, till is mapped in the area north of Package D3 and has been found underlying deposits mapped as belonging to the Black Park and Boyn Hill/Orsett Heath terrace in this area. For example, till is recorded beneath fluvial deposits ascribed to the Boyn Hill/Orsett Heath terrace at Hornchurch Railway Cutting (Bridgland 1994f). The Hornchurch Till and the other

mapped Till deposits in the area are thought to have been deposited during the Anglian Glaciation (478–424 Kya).

- 3.43 Till itself has limited archaeological and geoarchaeological potential, however, it may seal and preserve underlying stratigraphy containing archaeological sites, artefacts and/or associated palaeoenvironmental remains.

Tilbury Alluvial Deposits

- 3.44 The Tilbury Alluvial deposits refer to the sequence of Holocene sediments mapped within the lower reaches of the Thames (after Gibbard 1994) and is applied here specifically to describe the Holocene alluvial deposits within the route of the Lower Thames Crossing to the south and north of the River Thames (excluding the Mar Dyke) (Figure 3). The term ‘Thames floodplain deposits’ is also used to describe the Holocene floodplain sequence encountered more widely across the lower Thames Estuary.

- 3.45 The Tilbury Alluvial deposits comprise a range of sediments including:

- **minerogenic alluvium** comprising variable sequences of clays, silts and sands that form the dominant component of the Holocene sequence;
- **peat**, often forming distinct lenses and bands in the alluvium, and
- **organic-rich mud**, typically preserved as dark hued organic-rich clays and silts and distinct from minerogenic alluvium that may contain in-washed organic inclusions

- 3.46 The Holocene sediments of the Thames floodplain and Tilbury Alluvial deposits together form a tripartite sequence recognised throughout the lower Thames Estuary, although the general arrangement of deposits varies between sites, comprising:

- **Lower Alluvium;**
- **Banded peat and alluvium, and**
- **Upper alluvium**

- 3.47 The minerogenic and biogenic sediments have different formation processes and associated geoarchaeological potential and are outlined and considered individually in more detail below.

Minerogenic alluvium

- 3.48 Alluvium has been used as a banner term to describe a range of unconsolidated sediments that occur in riverine and estuarine environments, including both minerogenic and biogenic (e.g. peat) sediments. Here alluvium is taken to mean fine-grained minerogenic deposits widely recorded throughout the Lower Thames.
- 3.49 Alluvial clays, silts and sands volumetrically form the primary component of the Holocene alluvial sequences of the Thames. These deposits represent sediment accumulating under the influence of rising post-glacial sea-levels, deposited within a range of settings from early Holocene channel systems through to mud flats and salt marsh environments within the succeeding extensive intertidal floodplains.
- 3.50 The sequence of alluvial deposits, and intervening peats, has been intensively examined at Tilbury Docks and to the east at the Sewage Treatment works and Tilbury Power Station. Borehole surveys at the latter site revealed a deep sequence of alluvium, with intervening peats, resting on sands and gravels dipping from east to west to an altitude of -16.5 m OD, with increasing thickness to the west towards Tilbury Docks (Devoy 1979, Wessex Archaeology 2015, 2017, Quest 2016).
- 3.51 Holocene sequences dominated by alluvium up to and in excess of 10-15 m thick are present within marshland to the north (Tilbury Marshes) and south (Shorne Marshes) of the River Thames.
- 3.52 The geoarchaeological potential of the alluvium is generally low, although it still has the potential to contain or partially mask archaeology. Although alluvium contains palaeoenvironmental remains such as pollen and plant macrofossils, these are often poorly preserved and of uncertain source area, transported fluvially over potentially large areas. Alluvium also lacks suitable material of secure context for radiocarbon dating. However, targeted investigation of microfaunal remains contained in alluvium (e.g. diatoms, foraminifera and ostracods) can be useful for understanding the balance between marine and freshwater environments, particularly in relation to alluvium contained in early Holocene channels and where peat deposits provide datable horizons.

Peat

- 3.53 Peat comprises partially decomposed organic matter preserved within waterlogged anaerobic (oxygen-free) conditions. As a component of the Tilbury Alluvial deposits, the peat represents distinct phases of lowering and/or stable sea-level rise when semi-terrestrial plant communities encroached onto tidal mud flats and saltmarsh.
- 3.54 The sequence of peat deposits within the Tilbury Alluvium was studied extensively by Devoy (1979) who developed a stratigraphic framework for the Holocene sequence using data from sites throughout the lower Thames Estuary from Crossness to the Isle of Grain. Devoy's framework remains important for the examination of the peat deposits and can form a useful basis for assessing biogenic sediments identified during ground investigations.
- 3.55 Devoy (1979) identified five regressive phases represented by peat deposits (termed Tilbury I-V); the upper of these peats (Tilbury IV and V) were only locally preserved, with the basal peats (Tilbury I-III) most widely developed. At Tilbury these peat deposits occur between c. -16.5 to 0 mOD and date from between the late Mesolithic and Iron Age (broadly from c. 9300–2500 BP) (Devoy 1979; Wessex Archaeology 2015). Many of the deepest and earliest peats (Mesolithic) are likely to have formed within channels incised into the underling Pleistocene sands and gravels, with later peats (Neolithic and Bronze Age) forming extensive beds extending across the broad mid-Holocene floodplain.
- 3.56 These peat deposits vary in thickness from a few centimetres to over a metre or more, forming laterally and horizontally variable but extensive deposits within the alluvium. The peats also vary in composition, from structureless peats lacking visible plant remains to herbaceous (representing tall herb swamp habitats) and wood peats (representing alder-dominated wet carr-woodlands through to drier woodlands including oak and hazel).
- 3.57 Thin short-lived peats tend to represent reed swamp environments forming between phases of estuarine saltmarsh and mud flats, but where peat formation occurs over longer timeframes these reed swamps are often succeeded by sedge fen and wet carr woodland (containing boggy pools and pockets of sedges and reeds) and encroachment of trees from the dry ground tolerant of acid soils and some waterlogging.
- 3.58 These distinct peat types and vegetation habitats reflect hydrosere successions within the wetland in response to sea-level rise, hydrology, climate and vegetation dynamics modulated at the local to regional scale.
- 3.59 Variation in the thickness and altitudinal height of individual peat beds occur primarily as a result of sediment auto-compaction (peat can compress by up to 90%) but may also reflect the localised influence of topography and hydrology. In places peat can form laterally discontinuous horizons, in cases forming locally within the system of early Holocene channels that preceded more extensive floodplain development, or where formerly more extensive deposits have been subsequently eroded and removed.
- 3.60 The effects of variable lateral and vertical auto-compaction can also result in stratigraphic inversion of peat over relatively short distances, for example resulting in younger peats occurring at lower altitudes than nearby older peats.
- 3.61 The geoarchaeological and archaeological potential of peat deposits is high. Peat contains a range of botanical remains (e.g. pollen and plant macrofossils) preserved in the waterlogged anoxic (oxygen-free) conditions, representing important archives of information on past climate and palaeoenvironmental change and the impact of human communities on the landscape.
- 3.62 The peat deposits to the north of the River Thames (Package B3) have been more extensively examined than those to the south (Package A3), particularly in the vicinity of Tilbury where they form part of a deep Holocene sequence in places exceeding 15m (Devoy 1979, Wessex Archaeology 2017, 2018, Quest 2016).
- 3.63 Numerous palaeoenvironmental studies have been undertaken on peat deposits within the Lower Thames Estuary (e.g. Green et al. 2014, Sidell et al. 2000, Wilkinson et al. 2000) and associated tributaries (e.g. Powell et al. 2012), including the work of Devoy (1979) at Tilbury. These studies are too numerous to outline in detail here but have been critical in providing a wider landscape context for archaeologically documented evidence of human activity.
- 3.64 Where thicker peat layers are encountered, they have increased potential to contain archaeology, including waterlogged wooden structures and artefacts. Prehistoric timber trackways, mostly dating to the

Late Neolithic and early Bronze Age, have been unearthed in peat at a number of locations with the Thames floodplain of East London (the nearest example is located 10km to the west), in almost all cases during commercial developer-led investigations or eroding along the exposed foreshore (see Stafford et al. 2012, chapter 10 for a review).

- 3.65 In addition, human remains have also been found in wetland contexts, including remains recovered during the construction of the Tilbury Docks in the 1880s, recently analysed by Schulting (2013) and dating to the late Mesolithic.

Organic-rich muds

- 3.66 Organic rich muds have also been recorded amongst alluvial deposits in the Thames Estuary and tributaries. These deposits, like peat, are highly variable in extent, forming at stages in low energy environments including slow-moving or deactivated channels and within freshwater back swamp environments. Organic rich muds are distinct from alluvium in that they often contain a minor organic component that is typically derived from in-washed plant fragments or the roots of plants growing in saltmarsh or swamp.
- 3.67 Where associated with peat, organic muds may represent part of a hydrosere succession from freshwater swamps through to peat-forming tall herb swamp and carr-woodland communities. Lenses or bands of organic muds within peat could also reflect the development of freshwater pools within floodplain woodland habitats, sporadic or short-term flooding and fluctuating water-levels or retrogressive hydrosere successions. Deposition of organic clays may therefore occur in response to both large-scale and local factors, reflecting the spatially and temporally dynamic nature of wetland environments.
- 3.68 The geoarchaeological potential of organic rich deposits is high and comparable to peat, containing a range of palaeoenvironmental remains and material suitable for radiocarbon dating.

Mar Dyke

- 3.69 The Mar Dyke is a tributary of the River Thames, flowing for 18 km from a source near Great and Little Warley with an outlet at Purfleet. Extensive lateral spreads of alluvium are mapped by the BGS across Package C3 and D3, surrounded by equally extensive Head deposits.
- 3.70 Superficially, the mapped deposits within Packages C3 and D3 appear to be infilling a basin-like feature in the landscape, although the age, depth, extent and formation process of this feature are poorly understood. The potential of the Mar Dyke within the route of the Lower Thames Crossing therefore remains a significant unknown.
- 3.71 The Holocene alluvium also has the potential to include peat deposits of high geoarchaeological potential. These peat deposits have the potential to cover a more extensive date range than the Thames floodplain deposits that are a uniquely mid-Holocene phenomenon in coastal and estuarine landscapes of southern Britain (typically dating from the Mesolithic to early Iron Age).
- 3.72 For example, tributaries such as the Lea Valley, extensively studied as part of the 2012 Olympic Games, include peat and organic sediments dating to the Roman and Anglo-Saxon periods (Powell et al. 2012).
- 3.73 Unlike the Thames Estuary, peat formation within tributary valleys is not governed by the relationship to tidally influenced sea-levels. The Mar Dyke therefore has the potential to preserve peat and organic rich deposits of both early and late Holocene date, expanding upon the predominantly mid-Holocene palaeoenvironmental records present within the Tilbury Alluvial sequence.
- 3.74 The only palaeoenvironmental study within the Mar Dyke was undertaken by Scaife (1988) and Wilkinson (1988) but located close to the outfall near Purfleet where the sediments have more in common with the Thames Floodplain sequence than those likely to be encountered within the route of the Lower Thames Crossing. The deposits recorded by Scaife and Wilkinson included thick sequences of estuarine alluvium and peat, the latter comparable to those of Devoy (1979) dating from the Mesolithic to Bronze Age.
- 3.75 Any peat deposits within the Mar Dyke also have a high potential for the preservation of waterlogged archaeological remains.
- 3.76 However, any fine-grained alluvium present within the Mar Dyke will be of low geoarchaeological potential similarly to the alluvium of the Tilbury Alluvial sequence, although these deposits still have the potential to contain archaeology.

Geoarchaeological and Archaeological Characterisation Zones

3.77 To highlight the geoarchaeological potential of the Quaternary deposits likely to be present, the previous GDBA (HE540039-PCI-GEN-GEN-REP-GEO-00054) divided the GI areas into Geoarchaeological Characterisation Zones (GCZs). These were used to frame reporting on the Phase 2 GI monitoring (HE540039-PCI-VGT-GEN-REP-GEO-00027, HE540039-PCI-GEN-GEN-REP-GEO-00109 – 00112) and were based on an assessment of deposits mapped by the BGS, along with other available information on Quaternary sediments within and adjacent to the route. Subsequently an initial scheme wide Palaeolithic and Quaternary Deposits Model (PQDM) has been produced which has divided the entire scheme's impact footprint into 34 Palaeolithic and Quaternary (PQ) zones (Wenban-Smith and Bates 2000). In order to enhance cross combability between the results of geoarchaeological monitoring of GI and potential future purposive archaeological and geoarchaeological works, subsequent discussion of the Phase 2 and Phase 3 GI are framed within these PQ zones (Table 8, Figure 4) .

Table 8 – Palaeolithic and Quaternary (PQ) Zones

PQ Zone	Phase 2 GI work package	Phase 3 GI work package	Pleistocene deposits	Holocene deposits
1	None	None	?None	?None
2	None	None	Head	?Colluvium
3	A2	A3	Head within valleys	Colluvium within valleys
4	A2	A3	Sporadic occurrences of Head	?Colluvium with heads of dry valleys
5	A2	A3	Head within valleys	Colluvium within valleys
6	A2	A3	Head within valleys	Colluvium within valleys
7	A2	A3	? Kempton Park/East Tilbury Marshes terrace Taplow/Mucking terrace Lynch Hill/Corbets Tey terrace Head	Colluvium within valleys
8	A2	A3	? Kempton Park/East Tilbury Marshes terrace	Alluvium
9	B2 and B3	A3 and B3	Shepperton gravel	Alluvium
10	B2	B3	? Kempton Park/East Tilbury Marshes terrace	Alluvium
11	B2	None	Lynch Hill/Corbets Tey terrace ?Taplow/Mucking terrace	None
12a	B2	B3	? Lynch Hill/Corbets Tey terrace Taplow/Mucking terrace	None
12b	None	None	Taplow/Mucking terrace	None
13	C2	B3 and C3	Boyn Hill/Orsett Heath terrace	None
14	C2	B3 and C3	?Black Park terrace Head	?Colluvium
15	C2	B3 and C3	Head	?Colluvium
16	C2	C3	None	None
17	None	None	Lynch Hill/Corbets Tey terrace	None
18	None	None	Lynch Hill/Corbets Tey terrace	None
19	None	D3	Lynch Hill/Corbets Tey terrace	None
20a	D2	C3	Head	?Colluvium
20b	None	None	Head	?Colluvium
20c	None	None	Head	?Colluvium
21	D2	C3 and D3	?None	Alluvium

22a	D2	C3 and D3	?Head	Alluvium ?Colluvium
22b	D2	D3	?Head	Alluvium ?Colluvium
23a	D2	C3	Head	?Colluvium
23b	D2	C3	Head	?Colluvium
24	D2	D3	Head	?Colluvium
25	D2	D3	Boyn Hill/Orsett Heath terrace	None
26	None	None	?Black Park terrace ?Boyn Hill/Orsett Heath terrace	None
27	None	D3	Anglian glacio-fluvial sand and gravel Head	?Colluvium
28	None	D3	Stanmore Gravel (Pliocene or Early Pleistocene) Anglian glacio-fluvial sand and gravel	None
29	A2	A3	Head within valleys	Colluvium within valleys

3.78 A preliminary assessment of the palaeoenvironmental and archaeological/geoarchaeological potential of the deposits is provided in the PQDM (Wenban-Smith and Bates 2000). The results of this assessment are summarized in Table 9.

Table 9 – Summary of geoarchaeological and archaeological potential of deposits identified in PQ zones

PQ Zone	Key deposit type	Date	Palaeoenvironmental potential	Archaeological /geoarchaeological potential
1	?None	Pleistocene	None	Low-Moderate
2	Head	Pleistocene	?High	Uncertain
	?Colluvium	Holocene	Low	Uncertain
3	Head	Pleistocene	Low	Uncertain
	Colluvium	Holocene	Low	Uncertain
4	Head	Pleistocene	Low	Low-Moderate
	Colluvium	Holocene	Low	Uncertain
5	Head	Pleistocene	Low	Uncertain
	Colluvium	Holocene	Low	Uncertain
6	Head	Pleistocene	Low	Low-Moderate
	Colluvium	Holocene	Low	Uncertain
7	Taplow/Mucking terrace	Pleistocene	Moderate	Moderate-High
	Lynch Hill/Corbets Tey terrace Head	Pleistocene	Moderate	Moderate-High
	? Kempton Park/East Tilbury Marshes terrace	Pleistocene	Moderate	Moderate-High (surface) Uncertain (within terrace)

	Colluvium	Holocene	Low	Uncertain
8	? Kempton Park/East Tilbury Marshes terrace	Pleistocene	Moderate-High	Moderate-High
	Alluvium	Holocene	Moderate-High	Moderate-High
9	Shepperton gravel	Pleistocene	Low	Low-Moderate
	Alluvium	Holocene	High	Moderate-High
10	? Kempton Park/East Tilbury Marshes terrace	Pleistocene	Moderate	Moderate-High (surface) Uncertain (within terrace)
	Alluvium	Holocene	Moderate-High	Moderate-High
11	Lynch Hill/Corbets Tey terrace	Pleistocene	Uncertain	? Moderate
	?Taplow/Mucking terrace	Pleistocene	Uncertain	? Moderate
12a	?Lynch Hill/Corbets Tey terrace	Pleistocene	Uncertain	? Moderate
	Taplow/Mucking terrace	Pleistocene	Uncertain	? Moderate
12b	Taplow/Mucking terrace	Pleistocene	Uncertain	? Moderate
13	Boyn Hill/Orsett Heath terrace	Pleistocene	Uncertain	Moderate-High
14	? Black Park terrace	Pleistocene	Uncertain	? Moderate
	Head	Pleistocene	Low	Uncertain
	?Colluvium	Holocene	Low	Uncertain
15	Head	Pleistocene	Low	Uncertain
	?Colluvium	Holocene	Low	Uncertain
16	None	-	Low	Low-Moderate
17	Lynch Hill/Corbets Tey terrace	Pleistocene	High	Moderate-High
18	Lynch Hill/Corbets Tey terrace	Pleistocene	High	Moderate-High
19	Lynch Hill/Corbets Tey terrace	Pleistocene	Very high	Moderate-High
20a	Head	Pleistocene	Low	Low-Moderate
	? Colluvium	Holocene	Low	Uncertain
20b	Head	Pleistocene	Low	Low-Moderate
	? Colluvium	Holocene	Low	Uncertain
20c	Head	Pleistocene	Low	Low-Moderate

	? Colluvium	Holocene	Low	Uncertain
21	? None	Pleistocene	? Low	? Low
	Alluvium	Holocene	High	Uncertain
22a	? Head	Pleistocene	Low	Uncertain
	Alluvium	Holocene	Uncertain	Uncertain
	? Colluvium	Holocene	Low	Uncertain
22b	? Head	Pleistocene	Low	Uncertain
	Alluvium	Holocene	Uncertain	Uncertain
	? Colluvium	Holocene	Low	Uncertain
23a	Head	Pleistocene	Low	Low-Moderate
	? Colluvium	Holocene	Low	Uncertain
23b	Head	Pleistocene	Low	Low-Moderate
	? Colluvium	Holocene	Low	Uncertain
24	Head	Pleistocene	Low	Low-Moderate
	? Colluvium	Holocene	Low	Uncertain
25	? Black Park terrace	Pleistocene	? Moderate-High	? Moderate-High
	Boyn Hill/Orsett Heath terrace	Pleistocene	Moderate-High	Moderate-High
26	? Black Park terrace	Pleistocene	? Low	? Low-Moderate
	? Boyn Hill/Orsett Heath terrace	Pleistocene	? Low	? Low-Moderate
27	Anglian glacio-fluvial sand and gravel Head	Pleistocene	Low	Low-Moderate
	? Colluvium	Holocene	? Low	? Uncertain
28	Stanmore Gravel	Pliocene or Pleistocene	Low	Low-Moderate
	Anglian glacio-fluvial sand and gravel	Pleistocene	Low	Low-Moderate
29	Head	Pleistocene	Low	Low-Moderate
	Colluvium	Holocene	Low	Uncertain

3.79 The criteria on which these assessments are based is summarised in Table 10. Detailed discussions of the criteria are provided in the PQDM (Wenban-Smith and Bates 2000).

Table 10 – Generic schema for classifying palaeoenvironment, and archaeological and geoarchaeological potential

Palaeolithic potential	Likelihood	Likely importance
VERY HIGH	Very high	High
	High	Very high
HIGH	High	High, Medium
	Medium	High, Very high
MEDIUM	High	Low
	Medium	Medium
	Low	Very high, High
LOW	Medium	Low
	Low	Medium
	Negligible	Very high, High, Medium
NEGLECTIBLE	Medium	Negligible
	Low, Negligible	Low, Negligible
UNKNOWN	Unknown	High, medium, low or Negligible
	High, medium, low or Negligible	Unknown

4. General methods

Introduction

- 4.1 All works were undertaken in accordance with the detailed methods set out within the WSI (HE540039-PCI-GEN-GEN-REP-GEO-00102). This takes account of the assessment guidance provided by the DMRB Volume 10, Section 6, Part 1 (Highways Agency 2019), the standard and guidance issued by the Chartered Institute for Archaeologists (CIfA), including the Standard and Guidance for Archaeological Field Evaluation (CIfA 2014a), the Standard and Guidance for the Creation, Transfer and Deposition of Archaeological Archives (CIfA 2014b), and the CIfA Code of Conduct (CIfA 2014c), as well as Historic England guidance (Historic England 2015b; English Heritage, 2011).
- 4.2 A daily monitoring *pro forma* for each monitored GI intervention was completed, which recorded the GI intervention number monitored, a brief summary of observations and/or field notes, and the time and date of the monitoring.
- 4.3 The specific methods employed during archaeological monitoring and geoarchaeological investigations are summarised below.

Archaeological Monitoring

General

- 4.4 The specific methods employed during archaeological monitoring and geoarchaeological investigations are summarised below.
- 4.5 Monitoring works were carried out in accordance with the WSI (HE540039-PCI-GEN-GEN-REP-GEO-00102). Generally, trial pits were subject to archaeological monitoring. However, a number were missed due to programming issues (Table 11). Where locations were missed, GI logs were consulted.

Table 11 – Trial pits excavated during Phase 3 GI

GI Ref.	Work Package	PQ Zone	Depth (m below ground level)	Archaeologically monitored?
TP01300	A3	PQ-6	3.00	Yes
TP01302A	A3	PQ-6	3.20	No
TP01303	A3	PQ-6	5.25	Yes
TP01303A	A3	PQ-6	4.35	Yes
TP07300	B3	PQ-9	3.10	No
TP07301	B3	PQ-9	3.10	No
TP08303	B3	PQ-10	1.10	No
TP08304	B3	PQ-10	3.00	No
TP08305	B3	PQ-10	3.00	No
TP08307	B3	PQ-10	3.40	No
TP08308	B3	PQ-10	3.10	No
TP09300	B3	PQ-12a	2.30	No
TP10300	B3	PQ-15	4.00	Yes
TP10301	B3	PQ-15	4.00	Yes
TP11300	B3	PQ-14	4.00	Yes
TP12300	B3	PQ-13	3.00	Yes
TP12301	B3	PQ-13	4.00	Yes
TP13303	C3	PQ-13	3.20	Yes
TP13306	C3	PQ-15	3.80	Yes

TP13307	C3	PQ-15	3.00	No
TP13308	C3	PQ-13	5.20	Yes
TP14300	C3	PQ-13	3.00	Yes
TP14301	C3	PQ-13	3.00	Yes
TP14302	C3	PQ-13	2.80	Yes
TP15300	C3	PQ-13	2.20	Yes
TP15301	C3	PQ-20a	3.00	Yes
TP15303	C3	PQ-20a	4.40	Yes
TP15306	C3	PQ-20a	4.00	Yes
TP16307	C3	PQ-20a	4.00	Yes
TP16313	C3	PQ-20a	4.00	No
TP16314	C3	PQ-20a	4.00	No
TP17300	C3	PQ-20b	3.60	Yes
TP17301	C3	PQ-20b	4.00	No
TP19300	D3	PQ-25	3.00	Yes
TP19301	D3	PQ-25	3.00	Yes
TP19302	D3	PQ-24	4.00	Yes
TP19303	D3	PQ-24	4.00	Yes
TP20300	D3	PQ-25	4.00	Yes
TP20301	D3	PQ-25	2.20	No
TP21300	D3	PQ-25	3.00	Yes
TP21301	D3	PQ-25	4.00	Yes
TP21302	D3	PQ-25	4.00	Yes
TP21303	D3	PQ-22b	4.00	Yes
TP21304	D3	PQ-22b	4.00	Yes
TP21305	D3	PQ-27	4.00	Yes

- 4.6 Trial pits were monitored by a suitably qualified archaeologist. Trial pits were excavated by the GI Contractor using an appropriate mechanical excavator. The GI contractor was responsible for identifying the presence of services and ensuring it was safe to excavate.
- 4.7 Excavation of trial pits proceeded with a toothless ditching bucket under direct archaeological supervision, in level spits, until either the top of the first archaeological horizon or undisturbed pre-Quaternary deposits were encountered.
- 4.8 When the investigations had proceeded beyond Quaternary deposits, the archaeological monitoring for that trial pit was deemed to be complete.
- 4.9 The GI Contractor provided a suitable and safe position for the monitoring archaeologist to view the excavation of the trial pit. If archaeological remains were encountered, machine excavation would have ceased, to allow the remains to be inspected and recorded as far as safely practicable. In accordance with the WSI the trial pit was not entered by the monitoring archaeologist and no hand excavation of features or archaeological horizons was carried out. All recording was carried out from a safe position and in accordance with the site rules as set out by PCVJ and the GI Contractor.
- 4.10 Arisings from the trial pits were visually scanned for artefacts and ecofacts.
- 4.11 Appropriate strategies for the recovery, processing and assessment of artefacts and environmental samples were in line with those detailed in the WSI (HE540039-PCI-GEN-GEN-REP-GEO-00102)

Recording

- 4.12 All exposed archaeological deposits and features were recorded using a pro forma recording system. A record of the datum (either m above Ordnance Datum or m below ground level) levels of the archaeological deposits was provided by the GI Contractor. This data was then tabulated by trial pit and depth (Appendix A).
- 4.13 Where safe and practicable a scaled drawn record of representative exposed sections was made. A full photographic record was made using digital cameras equipped with an image sensor of not less than 10 megapixels. Digital images have been subject to managed quality control and curation processes, which has embedded appropriate metadata within the image and will ensure long term accessibility of the image set.

Geoarchaeological Investigations

General

- 4.14 As outlined in the WSI (HE540039-PCI-GEN-GEN-REP-GEO-00102) selected cable percussion boreholes were subject to on site geoarchaeological monitoring. Additionally, retained cores from selected sonic, dynamic and window sample boreholes were subject to geoarchaeological recording and assessment at a logging facility. In total 137 boreholes were monitored (Table 12).

Table 12 – Phase 3 bores subject to geoarchaeological monitoring

Work Package	Number of boreholes monitored
A3	34
B3	21
C3	23
D3	59
Total	137

- 4.15 Cable percussion boreholes subject to geoarchaeological monitoring in the field were drilled by the GI Contractor who provided a suitable and safe position from which arisings could be effectively viewed.

Geoarchaeological Recording

- 4.16 Deposits from boreholes from all GI interventions were described in the field by a suitably experienced geoarchaeologist or an experienced archaeologist advised by Wessex Archaeology's geoarchaeological team.
- 4.17 When the investigations had proceeded beyond Quaternary deposits, the geoarchaeological monitoring for that borehole was deemed to be complete.
- 4.18 Descriptions included information such as:
- Depth
 - Texture
 - Composition
 - Colour
 - Inclusions
 - Structure (bedding, ped characteristics etc.)
 - Contacts between deposits
- 4.19 Interpretations were made regarding the probable depositional environments and formation processes of the deposits.

4.20 All deposits were recorded using a pro forma recording system. A record of the datum (either m above Ordnance Datum or m below g Ordnance Datum) levels of was provided by the GI Contractor. This data was then tabulated by borehole and depth (Appendix B).

Palaeoenvironmental Sampling

4.21 Appropriate strategies for the recovery of palaeoenvironmental samples were in line with those detailed in the WSI (HE540039-PCI-GEN-GEN-REP-GEO-00054).

4.22 Due to on-site constraints no undisturbed samples from intact stratigraphy (in the form of U100s or UT100s) could be recovered during monitoring of cable percussion boreholes. However, bulk samples were taken where appropriate.

4.23 Assessment of selected cores from sonic and dynamic boreholes at the logging facility identified deposits with palaeoenvironmental potential. These cores are retained at the logging facility.

4.24 Assessment of selected cores from window sample boreholes at the logging facility identified deposits with palaeoenvironmental potential. These cores have not been retained at the logging facility and, where possible, units with palaeoenvironmental potential were sampled.

4.25 The potential of paleoenvironmental samples taken during both Phase 2 and Phase 3 GI have been considered. These have been assigned a low, moderate or high potential rating for assessment, based on the following criteria:

- Low –bulk samples from coarse grained deposit with little potential to preserve palaeoenvironmental datasets or material with poor stratigraphic integrity;
- Moderate – bulk samples from fine grained or organic deposits which may preserve palaeoenvironmental evidence and have at least moderate stratigraphic integrity;
- High – bulks or undisturbed samples from fine grained or organic deposits which are highly likely to preserve palaeoenvironmental data with at least moderate stratigraphic integrity.

4.26 Recommendations for paleoenvironmental assessment of selected samples are provided.

Deposit Modelling

4.27 The results of Phase 3 geoarchaeological monitoring and GI logs have been reviewed and assessed by an experienced geoarchaeologist. The results have been collated, integrated with the results of Phase 2 GI monitoring (HE540039-PCI-VGT-GEN-REP-GEO-00027, HE540039-PCI-GEN-GEN-REP-GEO-00109 – 00112) and framed within the PQ Zones outlined in PQDM (Wenban-Smith and Bates 2000) to produce an updated integrated record of the Quaternary deposits across the scheme.

4.28 The different lithologies and updated stratigraphic interpretations have been entered into Rockworks™ v17.0. Selected GI monitoring locations have been used to produce representative transects through the Quaternary deposits as a basis for reviewing the baseline information on superficial deposits contained in the GDBA (HE540039-PCI-GEN-GEN-REP-GEO-00030) and the PQDM (Wenban-Smith and Bates 2000). Based on geoarchaeological interpretation of the lithological data (e.g., peat, clay, silt, sand etc.), a set of stratigraphic units (e.g. alluvium, peat, buried soils etc.) were created to group sets of deposits across the scheme

4.29 The Rockworks data was used to create representative transects mapping the subsurface topography beneath key areas of the scheme.

4.30 The aims of the modelling were to interpret the data, identifying the probable environments represented, and determine areas of higher and/or lower geoarchaeological and archaeological potential. The objectives of the modelling were to enable the PQDM (Wenban-Smith and Bates 2000) to be further developed, in order to refine where purposive archaeological and geoarchaeological work may be required (e.g. deposits with potential for the recovery of significant archaeological evidence and palaeoenvironmental remains).

5. Results

Introduction

5.1 The results of archaeological and geoarchaeological monitoring of GI interventions across the Phase 3 GI works are presented together and framed within PQ zones outlined in the PQDM (Wenban-Smith and Bates 2020). Additionally, these results are augmented by those obtained during monitoring of Phase 2 GI monitoring (HE540039-PCI-VGT-GEN-REP-GEO-00027, HE540039-PCI-GEN-GEN-REP-GEO-00109 – 00112). Information drawn from both direct observation during monitoring and contained within GI logs is presented.

PQ Zone 1, Ebbsfleet Valley, HS1 Car Park

5.2 No Phase 2 or 3 GI interventions were carried out in this zone.

PQ Zone 2, Ebbsfleet Valley, West

5.3 No Phase 2 or 3 GI interventions were carried out in this zone.

PQ Zone 3, Ebbsfleet Valley, upland catchment

Introduction

5.4 Three Phase 3 boreholes were drilled in this zone (Figure 5). The Quaternary deposits encountered are summarized in Table 13 and discussed below.

Table 13 – GI interventions in PQ Zone 3

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (mbgl)	Notes
WS01314	3	3	None	-	
WS01315	3	3	Head	2.55-5.00+	
WS01316	3	3	None		

Pleistocene

Head

5.5 Made ground was recorded in all three interventions. One intervention identified Quaternary deposits (WS01315) beneath made ground. These comprised colluvial, slightly clayey, sand overlying chalky solifluction deposits.

Holocene

5.6 The upper part of the colluvial sequence in WS01315 may include Holocene colluvium.

Palaeoenvironmental samples

5.7 No deposits with palaeoenvironmental potential were identified in this zone, and no samples were taken.

Archaeological evidence

5.8 No Phase 2 or 3 trial pits were excavated in this zone.

PQ Zone 4, Shorne Woods Plateau

Introduction

5.9 One Phase 2 borehole was located in this zone (Table 14, Figure 6).

Table 14 – GI interventions in PQ Zone 4

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (m bgl)	Notes
BH01002	2	4	Head	0.40-1.20+	

Pleistocene

5.10 The single borehole (BH01002) recorded silty, slightly gravelly sands and slightly sandy gravelly clays, beneath a modern soil profile; these are colluvial Head deposits.

Holocene

5.11 The Head sequence in BH01002 may include Holocene colluvium.

Palaeoenvironmental samples

5.12 No deposits with palaeoenvironmental potential were identified in this zone, and no samples were taken.

Archaeological evidence

5.13 No Phase 2 or 3 trial pits were excavated in this zone.

PQ Zone 5, Jeskyns shelf

Introduction

5.14 Two Phase 2 interventions were located at the northern edge of this zone (Table 15, Figure 7). No Quaternary deposits were encountered. Made ground was recorded in both interventions. The made ground in BH01007 directly overlay Thanet Formation bedrock.

Table 15 – GI interventions in PQ Zone 5

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (m bgl)	Notes
BH01007	2	5	-	-	
TP01005	2	5	-	-	

Palaeoenvironmental samples

5.15 No deposits with palaeoenvironmental potential were identified in this zone, and no samples were taken.

Archaeological evidence

5.16 No archaeological evidence was recovered from the single trial pit located in this zone.

PQ Zone 6, Thong Lane

Introduction

5.17 Extensive Phase 2, Phase 2 NGGE and Phase 3 GI was located in this zone (Table 16, Figure 8). These comprised:

- Phase 2: 38 boreholes and 30 trial pits;
- Phase 2 NGGE: 17 boreholes and 29 trial pits, and
- Phase 3: 45 boreholes and 6 trial pits

5.18 The Quaternary deposits encountered are summarized in Table 16 and discussed below.

Table 16 – GI interventions in PQ Zone 6

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (m bgl)	Notes
BH01004	2	6	Head	0.20-1.70	
BH01005	2	6	Head	0.10-1.70	
BH01010	2	6	-	-	
BH01013	2	6	Head	0.40-1.20	
BH01014	2	6	-	-	
BH01015	2	6	-	-	
BH01018	2	6	Head	0.50-1.60	
BH01019	2	6	Head	0.05-0.90	
BH01020	2	6	Head	0.30-1.20	
BH01021	2	6	Head	0.20-3.06	
BH01022	2	6	Head	0.60-1.20	
BH01023	2	6	Head	0.15-2.30	
BH01024	2	6	Head	0.30-1.70	
BH01025	2	6	Head	0.20-1.28	
BH01026	2	6	Head	0.40-0.65	
BH01027	2	6	-	-	
BH01028	2	6	-	-	
BH01033	2	6	Head	0.35-2.30	
BH01034	2	6	Head	0.40-0.65	
BH02001	2	6			
BH02002	2	6	Head	0.10-2.90	
BH03001	2	6	Head	0.20-1.48	
BH03002	2	6	Head	0.40-3.12	
BH03003	2	6	-	-	
BH03004	2	6	-	-	
BH03005	2	6	-	-	
BH03006	2	6	Head	0.30-1.20	
TP01006	2	6	-	-	
TP01007	2	6	-	-	
TP01007A	2	6	-	-	
TP01009	2	6	Head	0.30-2.80	

TP01009A	2	6	Head	0.30-2.15	
TP01010	2	6	Head	0.50-1.20	
TP01010A	2	6	Head	0.40-1.60	
TP01011	2	6	-	-	
TP01011A	2	6	-	-	
TP01012	2	6	-	-	
TP01013	2	6	-	-	
TP01013A	2	6	Head	0.45-0.85	
TP01014	2	6	Head	0.50-1.00	
TP01014A	2	6	Head	0.25-1.60	
TP01015	2	6	Head	0.60-1.30	
TP01018	2	6	-	-	
TP02001	2	6	Head	0.25-0.40	
TP02002	2	6	Head	0.32-3.70	
TP02003	2	6	Head	0.30-3.70	
TP02004	2	6	Head	0.40-1.70	
TP03001	2	6	Head	0.35-0.85	
TP03002	2	6	Head	0.40-3.90	
TP03002A	2	6	Head	0.35-3.40	
TP03003	2	6	Head	0.35-0.95	
TP03004	2	6	Head	0.35-0.60	
TP03005	2	6	Head	0.30-2.10	
TP03006	2	6	Head	0.40-4.00	
TP03006A	2	6	Head	0.40-4.00	
TP03007	2	6	Head	0.35-3.30	
TP03008	2	6	Head	0.35-4.05	
WS01007	2	6	Head	0.70-3.45	
WS01014	2	6	Head	0.30-1.80	
WS01015	2	6	Head	0.70-1.20	
WS01016	2	6	Head	0.40-0.90	
WS01017	2	6	Head	0.70-1.50	
WS01018	2	6	Head	0.16-0.90	
WS02008	2	6	-	-	
WS02008A	2	6	-	-	
WS02008B	2	6	-	-	
WS03001	2	6	Head	0.25-0.70	
WS03002	2	6	-	-	
005-BH001	NGGE	6	Head	0.00-6.80	
005-BH002	NGGE	6	-	-	
005-BH003	NGGE	6	-	-	
005-BH004	NGGE	6	-	-	
005-BH005	NGGE	6	-	-	
005-BH006	NGGE	6	-	-	
005-BH010	NGGE	6	-	-	

005-BH011	NGGE	6	-	-	
005-BH012	NGGE	6	-	-	
005-BH013	NGGE	6	-	-	
005-TP001	NGGE	6	Head	0.30-3.80	
005-TP003	NGGE	6	Head	0.25-0.75	
005-TP004	NGGE	6	Head	0.30-0.90	
005-TP005	NGGE	6	Head	0.28-0.60	
005-TP007	NGGE	6	Head	0.30-0.70	
005-TP008	NGGE	6	-	-	
005-TP010	NGGE	6	Head	0.30-1.70	
005-TP011	NGGE	6	Head	0.40-0.90	
005-TP012	NGGE	6	Head	0.30-0.60	
005-TP013	NGGE	6	-	-	
005-TP014	NGGE	6	Head	0.30-0.80	
005-TP015	NGGE	6	Head	0.30-4.00	
005-TP019	NGGE	6	-	-	
005-TP020	NGGE	6	-	-	
005-TP022	NGGE	6	Head	0.35-1.60	
005-TP022A	NGGE	6	Head	0.30-0.55	
005-TP023	NGGE	6	Head	0.30-1.90	
005-TP024	NGGE	6	-	-	
005-TP024A	NGGE	6	-	-	
005-TP025	NGGE	6	Head	0.60-1.20	
018-BH001	NGGE	6	Head	0.70-6.70	
018-BH002	NGGE	6	Head	1.20-2.50	
018-BH003	NGGE	6	-	-	
018-BH004	NGGE	6	Head	1.00-1.60	
018-BH005	NGGE	6	Head	0.30-1.00	
018-BH008	NGGE	6	-	-	
018-TP001	NGGE	6	-	-	
018-TP002	NGGE	6	Head	0.30-2.40	
018-TP003	NGGE	6	Head	0.30-0.60	
018-TP004	NGGE	6	Head	0.40-0.80	
018-TP005	NGGE	6	Head	0.30-1.50	
018-TP006	NGGE	6	Head	0.30-0.90	
018-TP007	NGGE	6	Head	0.30-2.00	
018-TP008	NGGE	6	-	-	
018-TP009	NGGE	6	Head	1.60-5.00	
BH01317	3	6	-	-	
BH01317A	3	6	-	-	
BH01321	3	6	Head	0.30-6.00	
BH01322	3	6	-	-	
BH01327	3	6	Head	2.70-6.80	

BH01328	3	6	-	-	
BH01329	3	6	-	-	
BH01331	3	6	-	-	
BH01335	3	6	Head	0.30-5.00	
BH01336	3	6	Head	0.30-3.00	
BH01338	3	6	Head	0.30-1.00	
BH01339	3	6	Head	0.30-1.70	
BH01340	3	6	Head	0.40-4.83	
BH01341	3	6	-	-	
BH01342	3	6	-	-	
BH01344	3	6	Head	0.30-2.00	
BH01345	3	6	-	-	
BH01348	3	6	Head	0.30-0.70	
BH01350	3	6	-	-	
BH01354	3	6	Head	0.30-3.30	
BH01355	3	6	Head	0.35-1.00	
BH01356	3	6	Head	0.20-1.55	
BH01357	3	6	Head	0.30-4.95	
BH02306	3	6	Head	0.34-0.54	
BH02307	3	6	Head	0.00-0.80	
BH03302	3	6	Head	0.30-0.40	
BH03304	3	6	Head	0.30-0.70	
BH03306	3	6	-	-	
BH03308	3	6	-	-	
BH03309	3	6	-	-	
BH03310	3	6	-	-	
BH03311	3	6	-	-	
BH03312	3	6	-	-	
BH03313	3	6	Head	0.35-0.75	
BH03314	3	6	Head	0.20-0.80	
BH03317	3	6	Head	0.25-0.60	
BH03319	3	6	-	-	
BH03321	3	6	Head	0.35-0.60	
BH03322	3	6	Head	0.35-0.60	
TP01300	3	6	-	-	
TP01302A	3	6	Head	0.80-1.90	
TP01303	3	6	-	-	
TP01303A	3	6	Head	1.10-2.05	
TP02301	3	6	-	-	
TP02305	3	6	Head	0.30-2.60	
WS01312	3	6	-	-	
WS01312A	3	6	-	-	
WS01312B	3	6	-	-	
WS01312C	3	6	-	-	

WS01312D	3	6	-	-	
WS01313	3	6	-	-	

Pleistocene

Head

- 5.19 Head deposits are present within dry valleys across this zone. The distribution of the deeper Head deposits, broadly correlates with these valleys and where Head is mapped by the BGS (Figure 9). However, some of the deepest sequences are in the south-east of the zone outside of areas where Head is mapped (Figure 9).
- 5.20 The Head sequences encountered primarily consisted of slightly gravelly colluvial sandy silts and clays. In some instances, more gravelly units towards the base may be indicative of episodic water flow.
- 5.21 The deep Head sequences recorded in the southern part of the zone (Figure 9) comprised silty sands that became gravellier with depth. The gravel was sub-angular to sub-rounded fine to medium flint and chalk. This lithology suggests that they were primarily deposited through colluvial/solifluction processes.

Holocene

- 5.22 The upper part of the colluvial sequences include Holocene colluvial deposits; reworked later prehistoric lithics have been recovered from the upper colluvial deposits in interventions for the Package A NGGE GI (HE540039-PCI-VGT-GEN-REP-GEO-00027).

Palaeoenvironmental samples

- 5.23 The paleoenvironmental potential of the Head deposits in this zone is limited. Targeted sampling of deposits was carried out as part of the Phase 2 NGGE monitoring (HE540039-PCI-VGT-GEN-REP-GEO-00027). This identified a Holocene molluscan fauna from the upper part of the Head sequence in 018-TP02.

Archaeological evidence

- 5.24 No archaeological evidence was recovered from Phase 3 trial pits in this zone. Archaeological evidence from Phase 2 and Phase 2 NGGE monitoring comprised colluvial reworked, undiagnostic Holocene lithics from 018-TP002 (HE540039-PCI-VGT-GEN-REP-GEO-00027), an undated V-shaped ditch from 005-TP020 (HE540039-PCI-VGT-GEN-REP-GEO-00027), a likely modern amorphous cut feature in 018-TP003 (HE540039-PCI-VGT-GEN-REP-GEO-00027), and a shallow undated north west to south east orientated gully in TP03006 (HE540039-PCI-GEN-GEN-REP-GEO-00109)

PQ Zone 7, Filborough

Introduction

- 5.25 Six Phase 2 and seven Phase 3 interventions were in this zone (Figure 10). The Quaternary deposits encountered are summarized in Table 17 and discussed below.

Table 17 – GI interventions in PQ Zone 7

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (m bgl)	Notes
BH04001	2	7	Head	0.40-4.42	
BH04004	2	7	Head	0.20-4.57	Laminated
			?Silts and clays	4.57-6.40+	
BH04005	2	7	Head	0.20-3.00	

			?Silts and clays	4.15-7.80	
BH04009	2	7	Head	0.00-3.54	
			?Silts and clays	3.54-4.26	
TP04001	2	7	Head	0.20-1.70+	
TP04003	2	7	Alluvium	0.20-3.40	
			Head	3.40-4.20+	
BH04300	3	7	Head	0.35-4.00	
BH04301	3	7	Head	0.25-1.10	
BH04304	3	7	Head	0.35-2.75	
BH04305	3	7	Head	0.60-5.40	
BH04306	3	7	Head	0.20-7.75	
BH04308	3	7	Head	0.80-6.39	
WS04300	3	7	Head	0.45-4.85	

Pleistocene

Fluvial sands and gravels

5.26 Although Pleistocene Fluvial Sands and Gravels are mapped within the zone, no unequivocal Pleistocene fluvial deposits were identified in in this zone during GI monitoring. Interventions were, however, concentrated away from areas where these deposits are mapped by the BGS (Figure 10).

Silts and clays

5.27 Silts and clays, beneath Head, were recorded in three interventions. These comprised greenish grey sandy silty clays, which in one intervention (BH04004) were noted to be laminated. These deposits may represent the southern lateral margin of an unmapped sequence of fine-grained Pleistocene, potentially estuarine, sediments recorded in PQ-Zone 8 (Figure 11).

Head

5.28 Head sequences overlying chalk bedrock slopes were recorded across this zone. These Head deposits are up to 7.55 m thick and comprised sandy gravelly clays. The gravel component comprised angular, sub-angular and sub-rounded flint clasts, including Palaeogene marine pebbles reworked from the Thanet Formation. The lithological characteristics of these units is indicative of deposition through colluvial and/or solifluction processes.

Holocene

Head

5.29 The uppermost parts of the Head sequences in this zone may include Holocene colluvial deposits.

Alluvium

5.30 One intervention (TP04300) located the southern edge of the Holocene alluvial sequence present further south in PQ Zones 8, 9 and 10. The alluvial deposits in TP04300 were all minerogenic silts and clays; they overlay Head deposits.

Palaeoenvironmental samples

5.31 One bulk sample was taken from a sandy silty clay unit which may belong to the sequence of Pleistocene silts and clays (Table 18). This is classed as having moderate paleoenvironmental potential.

Table 18 – Palaeoenvironmental bulk samples from GI interventions in PQ Zone 7

GI Ref.	GI Phase	PQ Zone	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Potential for assessment
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BH04005	2	7	9400501	5	9400507	Sandy silty clay	Silts and clays	Moderate
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5.32 One core length was identified in the logging facility that has potential for palaeoenvironmental assessment. This is summarised in Table 19.

Table 19 – Phase 3, PQ Zone 7 core lengths in logging facility with paleoenvironmental potential

GI Ref.	GI Phase	PQ Zone	Core lengths (m)	Stratigraphy	Comments
BH04308	3	7	4.50-6.00m	Head	

Archaeological evidence

5.33 No archaeological evidence was identified in trial pits excavated in this zone.

PQ Zone 8, Thames, southern floodplain edge

Introduction

5.34 Fourteen Phase 2 and eighteen Phase 3 GI interventions were in this zone (Figure 12). The Quaternary deposits encountered are summarized in Table 20 and discussed below.

Table 20 – GI interventions in PQ Zone 8

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (mbgl)	Notes
BH04006	2	8	Alluvium	0.25-2.60	
			Head	2.60-5.55	
BH04007	2	8	Alluvium	0.30-3.00	
			Head	3.00-10.20	
BH04008	2	8	Head	0.50-3.70+	
			?Silts and clays	3.70-5.00+	
BH04010	2	8	Alluvium	0.30-3.50	
			Head	3.50-4.80	
BH04011	2	8	Alluvium	0.45-3.40	
			Peat	3.40-4.10	
			Alluvium	4.10-5.60	
			Head	5.60-17.90	
BH04012	2	8	Alluvium	0.50-4.90	
			Head	4.90-9.60	
BH04013	2	8	Alluvium	0.60-9.20	
			Head	9.20-14.00	
			Silts and clays	14.00-17.90	Laminated
			Sands and gravels	17.90-21.40	Laminated
BH04014	2	8	Alluvium	0.60-5.20	
			Head	5.20-8.00	
			Silts and clays	8.00-18.50	Laminated

			Sands and gravels	18.50-19.60	
			Head	19.6-21.90	
BH04015	2	8	Alluvium	0.20-4.50	
			Peat	4.50-6.50	
			Alluvium	6.50-9.00	
			Head	9.00-13.95	
			Silts and clay	13.95-17.60	
			Sands and gravels	17.60-21.50	Laminated
BH04017	2	8	Alluvium	0.30-10.07	
			Head	10.70-15.10	
			Fluvial Sands and Gravels	15.10-20.07	
BH05002	2	8	Alluvium	1.20-2.80	
			Peat	2.80-3.10	
			Alluvium	3.10-14.30	
			Silts and clays	14.30-18.35	Laminated
			Head	18.35-20.40	
TP04002	2	8	Alluvium	0.10-1.80	
			Head	1.80-3.70	
TP04004	2	8	Head	0.40-3.70+	
WS04008	2	8	Alluvium	0.40-5.00+	
BH04307	3	8	Alluvium	1.20-2.50	
			Head	2.50-3.50	
			Silts and clays	3.50-7.70	Laminated
BH04309	3	8	Head	0.80-5.50	
BH04310	3	8	Head	0.20-6.20	
BH04311	3	8	Alluvium	0.35-5.20	
BH04312	3	8	Alluvium	0.20-3.00	
			Peat	2.50-4.50	
			Alluvium	4.50-4.90	
			Head	4.90-6.30	
			Silts and clays	6.30-13.00	
			Head	13.00-19.50	
BH04313	3	8	Alluvium	0.13-2.75	
			Peat	2.75-3.00	
			Alluvium	3.00-6.20	
			Head	6.20-9.73	
BH04314	3	8	Alluvium	0.30-2.80	
			Peat	2.80-3.20	
			Alluvium	3.20-3.50	
			Head	3.50-6.50	
			Silts and clays	6.50-11.60	Laminated
			Head	11.60-18.10	

BH04315	3	8	Alluvium	0.10-6.65	
			Head	6.65-7.06	
			Silts and clays	7.06-15.00+	
BH04316	3	8	Alluvium	0.50-5.80	
			Peat	5.80-8.40	
			Alluvium	8.40-9.50	
			Silts and clays	9.50-18.60	
			Sands and gravels	18.60-20.50	
BH04317	3	8	Alluvium	0.30-6.70	
			Head	6.70-13.00	
			Silts and clays	13.00-16.20	Laminated
			Sands and gravels	16.20-19.00	
BH04318	3	8	Alluvium	0.40-10.00+	
BH04319	3	8	Alluvium	0.75-15.00+	
BH04320	3	8	Alluvium	0.10-3.65	
			Peat	3.65-3.88	
			Alluvium	3.88-7.20	
			Peat	7.20-7.60	
			Alluvium	7.60-8.37	
			Head	8.37-13.20	
			Silts and clays	13.20-17.32	
			Sands and gravels	17.32-19.50	
BH04321	3	8	Alluvium	0.01-8.20	
			Head	8.20-14.60	
			Fluvial Sands and Gravels	14.60-20.30	
BH04322	3	8	Alluvium	0.50-1.00	
			Peat	1.00-1.20	
			Alluvium	1.20-2.81	
			Peat	2.81-3.00	
			Alluvium	3.00-7.10	
			Peat	7.10-8.47	
			Alluvium	8.47-11.76	
			Head	11.78-15.00+	
BH04323	3	8	Alluvium	0.20-10.60	
			Head	10.60-15.00	
			Fluvial Sands and Gravels	15.00-19.80	
BH04324	3	8	Alluvium	00.20-10.00	
			Head	10.00-15.50	
			Fluvial Sands and Gravels	15.50-20.50	
WS04302	3	8	Alluvium	0.50-5.00+	

Pleistocene

Silts and clays

- 5.35 An unmapped sequence of Pleistocene silts and clays have been identified, which stratigraphically divide the two sets of Head deposits; in GI interventions they ranged up to 9.00m in thickness and had a basal elevation of between -7.00 and -17.00 m OD. These silts and clays comprised greenish grey sandy silts and clays, which were generally clast free or had a low clast content; they were also frequently laminated. These laminated sediments are characteristic of low energy, potential estuarine deposition. Their stratigraphic position, between two sets of Head deposits, demonstrates that these fine-grained deposits are Pleistocene in date.
- 5.36 Sands and gravels were recorded at the base of the northern-most extent of Pleistocene silts and clays (Figure 11). These comprised gravelly sands and clays dominated by sub-angular to sub-rounded flint clasts. This lithology and the stratigraphic position of gravelly sands and clays indicates that a generally high energy phase of fluvial deposition occurred prior to the deposition of the potentially estuarine silts and clays. The base of these deposits was found at approximately -19 m OD.

Head

- 5.37 Two stratigraphically separate sets of Head deposits were recorded in this zone, bracketing the potentially estuarine fine-grained silts and clays (Figure 11).
- 5.38 The upper Head comprised a greenish brown, frequently mottled, gravelly silty, fine to coarse, sand. The gravel component consisted of angular, sub-angular and rounded flints clasts, including material reworked from Paleogene marine deposits. This upper Head was more than 6.00 m thick in paces. The lithological characteristics indicate that this is primarily a colluvial deposit.
- 5.39 The lower Head, underlying the potential estuarine silts and clays, comprised stiff dark grey clays and gravelly clays. The gravelly clay units contained angular, sub-angular and sub-rounded chalk and flint clasts. The high chalk clast content is particularly distinctive. The lithological characteristics are indicative of colluvial and solifluction processes being primarily responsible for deposition.

Fluvial sands and gravels

- 5.40 High energy fluvial sands and gravels were present beneath Holocene alluvium across the northern part of this zone (Figure 11) with a basal elevation of approximate -20 m OD. Towards their southern margins, these sands and gravels were overlain by the upper Head deposits.

Holocene

Alluvium

- 5.41 Minerogenic Holocene alluvial deposits overlay the Pleistocene deposits in interventions across much of this zone. The basal heights of these alluvial deposits ranged from -2.30 m OD in the south to -11.48 m OD in the north.

Peats

- 5.42 Peats were recorded within the Holocene alluvial sequence across this zone; these generally ranged from 0.40 to 2.00 m in thickness. A well-developed peat was identified in several interventions in southern part of the zone, which had a basal elevation of approximately -5.50 m OD (Figure 11).

Palaeoenvironmental samples

- 5.43 Forty-nine bulk samples were taken from Quaternary deposits in this zone. The potential of this sample for palaeoenvironmental assessment has been considered and is summarised in Table 21.

Table 21 – Palaeoenvironmental samples from GI interventions in PQ Zone 8

GI Ref.	GI Phase	PQ Zone	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Potential for assessment
BH04012	2	8	9401201	5	9401206	Organic silty clay	Alluvium	Low
BH04015	2	8	9401501	1	9401503	Organic clay	Alluvium	Low
BH04015	2	8	9401502	10	9401506	Organic clay	Alluvium	Low

BH04307	3	8	90430701	5	90430706	Laminated sands	?Silts and clays	Moderate
BH04307	3	8	90430702	2	90430707	Sandy clay	?Silts and clays	Moderate
BH04307	3	8	90430703	5	90430707	Sandy clay	?Silts and clays	Moderate
BH04309	3	8	90430901	10	90431004	Gravelly sandy clay	Head	Low
BH04309	3	8	90430902	5	90431005	Sandy clay	Head	Low
BH04309	3	8	90430903	0.5	90431007	Sandy clay	Silts and clays	Moderate
BH04310	3	8	90431001	0.5	90431006	Silty clay	Silts and clays	Moderate
BH04310	3	8	90431002	10	90431006	Silty clay	Silts and clays	Moderate
BH04311	3	8	90431001	0.5	90431002	Organic silty clay	Alluvium	Low
BH04311	3	8	90431002	10	90431004	Organic silty clay	Alluvium	Low
BH04312	3	8	90431201	10	90431205	Peat	Peat	Moderate
BH04312	3	8	90431202	10	90431207	Gravelly sandy clay	Silts and clays	Low
BH04312	3	8	90431203	1	90431207	Laminated sandy clay	Silts and clays	Moderate
BH04312	3	8	90431204	1	90431208	Laminated silty clay	Silts and clays	Moderate
BH04312	3	8	90431205	5	90431208	Laminated silty clay	Silts and clays	Moderate
BH04312	3	8	90431206	5	90431209	Shelly silt	Sands and gravels	Moderate
BH04312	3	8	90431207	2	90431209	Shelly silt	Sands and gravels	Moderate
BH04312	3	8	90431208	8	90431210	Laminated grey clay and black sand	Sands and gravels	Moderate
BH04312	3	8	90431209	3	90431210	Laminated grey clay and black sand	Sands and gravels	Moderate
BH04312	3	8	90431210	7	90431211	Laminated sands and clays	Sands and gravels	Moderate
BH04315	3	8	90441501	0.5	90431608	Silty clay	Laminated silty clay	Silts and clays
BH04315	3	8	90441502	0.5	90431609	Silty clay	Silts and clays	High
BH04315	3	8	90441503	0.5	90431609	Silty clay	Silts and clays	High
BH04315	3	8	90441504	0.5	90431609	Silty clay	Silts and clays	High
BH04315	3	8	90441505	0.5	90431609	Silty clay	Silts and clays	High
BH04315	3	8	90441506	0.5	90431609	Silty clay	Silts and clays	High
BH04315	3	8	90441507	0.5	90431609	Silty clay	Silts and clays	High
BH04315	3	8	90441508	0.5	90431609	Silty clay	Silts and clays	High

BH04315	3	8	90441509	0.5	90431609	Silty clay	Silts and clays	High
BH04316	3	8	90441601	5	90431604	Organic clay	Alluvium	Low
BH04316	3	8	90441602	10	90431606	Laminated sandy clay	Silts and clays	Moderate
BH04316	3	8	90441603	5	90431606	Laminated sandy clay	Silts and clays	Moderate
BH04316	3	8	90441604	2	90431607	Laminated sandy clay	Silts and clays	Moderate
BH04317	3	8	90441701	10	90431703	?Laminated clay	Alluvium	Low
BH04317	3	8	90441702	5	90431704	Shelly sandy clay	Head	?Moderate
BH04317	3	8	90441703	10	90431704	Shelly sandy clay	Head	?Moderate
BH04317	3	8	90441704	10	90431706	Laminated clay	Silts and clays	Moderate
BH04317	3	8	90441705	2	90431707	Laminated clay	Silts and clays	Moderate
BH04323	3	8	90432301	0.5	90431703	Organic clay	Alluvium	Low
BH04323	3	8	90432302	20	90431704	Sandy clay	Alluvium	Low
BH04323	3	8	90432303	10	90431705	Organic clay	Alluvium	Low
BH04323	3	8	90432304	5	90431706	Sandy clay	Alluvium	Low
BH04324	3	8	90432301	10	90431705	Organic clay	Alluvium	Low
BH04324	3	8	90432302	1B	90431706	Clay	Alluvium	Low
BH04324	3	8	90432303	10	90431707	Organic clay	Alluvium	Low
BH04324	3	8	90432304	10	90431711	Organic clay	Alluvium	Low

5.44 Core lengths from five cores were identified in the logging facility that have potential for paleoenvironmental assessment. These include peats within the Holocene alluvial sequences and fine-grained Pleistocene laminated silts and clays. The identified core lengths are summarised in Table 22.

Table 22– Phase 3, PQ Zone 8 core lengths in logging facility with paleoenvironmental potential

GI Ref.	GI Phase	PQ Zone	Core lengths (m)	Stratigraphy	Comments
BH04313	3	8	1.50-3.00	Peat	
BH04313	3	8	6.00-9.70	Head	
BH04315	3	8	6.50-15.00	Head	Sub-sampled (see Table 19)
				Silts and clays	
BH04320	3	8	6.00-9.00	Peat and alluvium	
BH04320	3	8	13.00-17.50	Silts and clays	
BH04321	3	8	8.00-15.00	Head	
BH04322	3	8	1.50-9.00	Peat and alluvium	
BH04322	3	8	11.50-15.00	Head	

Archaeological evidence

5.45 No Phase 3 trial pits were excavated in this zone and no significant archaeological evidence was identified during Phase 2 trial pitting

PQ Zone 9, Thames main floodplain

Introduction

5.46 A total of 122 Phase 2 and 3 GI interventions were carried out in this zone (Figures 13). These are summarized below:

- Phase 2: 91 boreholes, and
- Phase 3: 29 boreholes and 3 trial pits

5.47 These interventions produced a consistent sequence of Holocene alluvial deposits, containing peats, over high energy fluvial sands and gravels.

Pleistocene

Fluvial Sands and Gravels

5.48 Fluvial sands and gravels with a broadly consistent basal elevation of c. -20.0 m OD were identified across the zone (Figure 14). These sands and gravel generally comprised sub-angular to sub-rounded fine to coarse flint clasts in a fine to coarse sand matrix. They reflect high energy fluvial deposition.

Holocene

Alluvium

5.49 The fluvial sands and gravels were overlain by an extensive sequence of Holocene alluvial deposits, which ranged up to approximately 19 m in thickness (Figure 14). These alluvial deposits generally comprised silty clays and clayey sands with variable organic content. Peat deposits were regularly observed within the sequences.

Peat

5.50 Peats identified in this zone are summarized in Table 23. Peats generally, but sporadically, occurred at two broad basal elevations; -5.50 and -11.50 m OD (Figure 14). The upper of these peats may be broadly equivalent with the well-developed peat identified at a similar basal elevation in PQ Zone 8 (see above). A relative thin peat was also recorded directly overlying, or close, to the contact with Pleistocene fluvial sands and gravels in three interventions (OH06006, OH06008 and BH07036).

Table 23 – Peats in GI interventions in PQ Zone 9

GI Ref.	GI Phase	PQ Zone	Top of peat (m bgl)	Base of peat (m bgl)	Comments
BH04016	2	9	6.70	7.50	
BH04019	2	9	7.90	8.20	
BH04020	2	9	4.55	4.80	
BH04020	2	9	7.45	7.70	
BH04021	2	9	1.20	1.45	
BH04325	3	9	1.70	2.50	
BH04325	3	9	8.00	10.5	
BH04326	3	9	4.10	4.60	
BH04326	3	9	7.10	8.20	
BH04327	3	9	4.50	4.80	
BH04327	3	9	9.20	9.40	
BH04329	3	9	4.30	4.50	

BH04329	3	9	7.90	8.00	
BH04330	3	9	8.90	9.00	
BH04331	3	9	1.20	1.80	
BH04332	3	9	8.65	9.00	
BH04333	3	9	7.40	7.80	
BH04334	3	9	5.10	5.20	
BH04334	3	9	7.85	7.95	
BH04334	3	9	11.10	11.35	
BH05001	2	9	10.90	11.20	
BH05010	2	9	4.1	4.40	
BH05304	3	9	7.350	7.85	
BH05304	3	9	9.75	9.85	
BH05309	3	9	2.40	2.50	
BH05309	3	9	4.40	4.50	
BH05309	3	9	8.50	8.60	
BH05309	3	9	11.80	12.40	
BH05310	3	9	5.20	5.50	
BH05310	3	9	7.83	8.43	
BH05310	3	9	9.44	9.60	
BH06015	2	9	12.20	13.50	
BH06016	2	9	12.80	13.20	
BH07015	2	9	12.50	13.60	
BH07015	2	9	19.40	20.00	
BH07020	2	9	12.00	13.80	
BH07021	2	9	12.50	13.50	
BH07024	2	9	8.70	9.00	
BH07024	2	9	11.8	12.75	
BH07031	2	9	13.00	14.00	
BH07032	2	9	13.15	13.95	
BH07032	2	9	19.95	20.15	
BH07032	2	9	22.60	22.9	
BH07034	2	9	12.00	13.00	
BH07039	2	9	10.65	10.95	
BH07039	2	9	12.60	13.95	
BH07049	2	9	13.50	14.30	
BH07053	2	9	12.15	12.95	
BH07053	2	9	25.07	25.25	
BH07062	2	9	11.80	12.50	
BH07063	2	9	11.30	11.60	
BH07065	2	9	12.50	13.00	
BH07069	2	9	5.00	5.80	
BH07071	2	9	10.50	11.45	
OH06002	2	9	12.70	13.70	
OH06003	2	9	12.30	12.90	

OH06004	2	9	12.50	13.80	
OH06006	2	9	14.50	15.00	
OH06006	2	9	24.50	24.95	Close to contact with fluvial gravel
OH06008	2	9	24.00	24.80	Close to contact with fluvial gravel
OH07007	2	9	12.10	12.8	
OH07007	2	9	21.65	21.9	
OH07008A	2	9	18.50	19.3	
OH07023	2	9	12.65	13.4	
OH07023	2	9	18.40	18.9	
OH07026	2	9	10.50	10.8	
OH07026	2	9	13.50	14	
OH07034	2	9	12.50	13.5	
OH07035	2	9	12.75	14	
OH07035	2	9	19.30	20.2	
OH07036	2	9	14.00	14.25	
OH07036	2	9	25.00	26.25	Overlying fluvial sands and gravels
OH07037	2	9	13.20	15	
OH07039	2	9	11.90	12.4	
OH07040	2	9	12.25	12.9	
OH07040	2	9	21.50	21.8	
WS04007	2	9	2.50	2.7	
WS04304	3	9	3.70	4.25	
WS04305	3	9	4.70	5	
WS04307	3	9	2.10	2.2	
WS05001	2	9	1.70	3	
WS05300	3	9	1.90	2	

Palaeoenvironmental samples

5.51 Bulk samples were primarily taken from the Holocene alluvial sequences in this zone. The potential of these samples for paleoenvironmental assessment are summarized in Table 24.

Table 24 – Palaeoenvironmental samples from GI interventions in PQ Zone 9

GI Ref.	GI Phase	PQ Zone	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Potential for assessment
BH05001	2	9	9500101	10	9500106	Organic silty clay	Alluvium	Low
BH05001	2	9	9500102	1	9500108	Organic clay	Alluvium	Low
BH05001	2	9	9500103	10	9500111	Peat	Peat	Low (heavily disturbed)
BH05001	2	9	9500104	10	9500112	Silty sandy clay	Alluvium	Low
BH04326	3	9	9042601	0.5	90432604	Peat	Peat	Moderate
BH04326	3	9	9042602	0.5	90432606	Organic clay	Alluvium	Low
BH04326	3	9	9042603	5	90432608	Gravelly silty clay	Alluvium	Low
BH04326	3	9	9042604	15	90432609	Silty clay	Alluvium	Low

BH04326	3	9	9042605	5	90432611	Sandy clay	Head	Low
BH04327	3	9	9042701	0.5	90432702	Peat	Peat	Moderate
BH04327	3	9	9042702	0.5	90432702	Organic silty clay	Alluvium	Low
BH04327	3	9	9042703	10	90432706	Peat	Peat	Moderate
BH04330	3	9	90433001	10	90433004	Organic clay silt	Alluvium	Low
BH04330	3	9	90433002	10	90433007	Organic silty sand	Alluvium	Low
BH04330	3	9	90433003	0.5	90433009	Sand	Alluvium	Low
BH04330	3	9	90433004	2.5	90433012	Sand	Fluvial sands and gravels	Low
BH04331	3	9	90433101	2	90433104	Peat	Peat	Moderate
BH04331	3	9	90433102	5	90433106	Organic clay	Alluvium	Low
BH04331	3	9	90433103	5	90433109	Chalky clay	?Head	?Moderate
BH04333	3	9	90433301	5	90433304	Organic clay	Alluvium	Low
BH04333	3	9	90433302	5	90433306	Organic clay	Alluvium	Low
BH04333	3	9	90433303	5	90433308	Gravelly sand	Alluvium	Low
BH04333	3	9	90433304	10	90433309	Shelly clay	?Alluvium	?Moderate
BH04333	3	9	90433305	3	90433310	Sand	Fluvial sands and gravels	Low

5.52 Core lengths from six cores were identified in the logging facility that have potential for paleoenvironmental assessment. All are taken through Holocene alluvial sequence that include peats. The selected core lengths are summarised in Table 25.

Table 25 – Phase 3, PQ Zone 9 core lengths in logging facility with paleoenvironmental potential

GI Ref.	GI Phase	PQ Zone	Core lengths (m)	Stratigraphy	Comments
BH04329	3	9	3.50-5.00	Peat and alluvium	
BH04329	3	9	7.00-8.00	Peat and alluvium	
BH04332	3	9	7.50-9.00	Peat and alluvium	
BH04334	3	9	4.50-6.00	Peat and alluvium	
BH04334	3	9	7.00-8.00	Peat and alluvium	
BH05304	3	9	6.00-10.50	Peat and alluvium	
BH05309	3	9	1.50-12.00	Peat and alluvium	
BH05310	3	9	5.20-10.50	Peat and alluvium	

Archaeological evidence

5.53 No Phase 2 or 3 trial pits were excavated in this zone.

PQ Zone 10, Thames, northern floodplain edge

Introduction

5.54 Thirteen Phase 2 and nineteen Phase 3 GI interventions were in this zone (Figure 15). The Quaternary deposits encountered are summarized in Table 26 and discussed below.

Table 26 – GI interventions in PQ Zone 10

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (m bgl)	Notes
BH08008	2	10	Alluvium	0.70-5.10	
			Silts and clays	5.10-14.45	
			Sands and gravels	14.45-19.10	
BH08010	2	10	Alluvium	0.40-17.30	
			Silts and clays	5.10-14.45	
			Sands and gravels	14.45-19.40	
BH08011	2	10	Alluvium	0.50-5.00	
			Silts and clays	4.40-5.50+	
BH08013	2	10	Alluvium	0.50-4.70	
			Peat	4.70-5.90	
			Silts and clays	5.90-12.55	
			Sands and gravels	12.55-20.00	
BH08014	2	10	Alluvium	0.20-6.60	
			Silts and clays	6.60-14.50	
			Sands and gravels	14.50-19.30	
BH08018	2	10	Alluvium	0.50-5.00	
			Silts and clays	5.00-14.50	
			Sands and gravels	16.10-20.80	
BH08019	2	10	Alluvium	0.50-3.40	
			Peat	3.40-4.90	
			Alluvium	4.90-6.50	
BH08020	2	10	Alluvium	0.50-5.40	
			Peat	5.40-6.50	
			Alluvium	6.65-8.05	
BH08022	2	10	Alluvium	0.20-2.70	
			Peat	2.70-4.20	
			Alluvium	4.20-5.25	
BH08023	2	10	Alluvium	0.45-2.10	
			Peat	2.10-3.00	
			Alluvium	3.00-4.10	
			Fluvial Sands and Gravels	4.10-5.10+	
OH07024	2	10	Alluvium	6.90-22.80	

			Fluvial Sands and Gravels	22.80-25.00	
TP08007	2	10	Alluvium	0.80-1.00+	
WS08001	2	10	Alluvium	0.40-3.00+	
WS08003	2	10	Alluvium	0.50-3.10+	
WS08004	2	10	Alluvium	0.70-4.00	
			Peat	4.00-5.00+	
BH08303	3	10	Alluvium	0.45-4.80	
			Silts and clays	4.80-12.70	
			Sands and gravels	12.70-19.30	
BH08305	3	10	Alluvium	0.45-6.00	
			Peat	6.00-6.85	
			?Alluvium	6.85-13.90	
			Fluvial Sands and Gravels	13.90-16.90	
BH08307	3	10	Alluvium	0.20-3.30	
			Peat	3.30-5.70	
			Alluvium	5.70-7.40	
BH09300	3	10	Head	0.55-3.40	
			Fluvial Sands and Gravels	3.40-5.25	
TP08303	3	10	-	-	
TP08304	3	10	Alluvium	1.55-3.00+	
TP08305	3	10	Alluvium	1.80-3.00+	
TP08307	3	10	Alluvium	0.30-3.40+	
TP08308	3	10	Alluvium	0/.00-3.10+	

Pleistocene

Silts and clays

5.55 An unmapped sequence of Pleistocene silts and clays was identified in this zone. These deposits had a basal elevation of -12.00 m OD in GI interventions and ranged up to 9.50 m in thickness. These silts and clays are very similar to those identified in PQ zone 8 (see above) and comprised greenish grey sandy clays and silts, which were generally clast free or had a low clast content. Some units contained organic material and they were occasionally noted to be laminated. These sediments are characteristic of low energy, potentially estuarine, deposition.

5.56 Sands and gravels were recorded at the base of the silts and clays. These ranged up to 6.60m thick, with a basal elevation at approximately -18 to -16 m OD. These comprised sands and gravels and gravelly sands, with gravel generally consisting of sub-angular to sub-rounded flint clasts; they were often observed to fine upwards through the sequences. These reflect a phase of generally high energy fluvial deposition predating the silts and clays.

Fluvial sands and gravels

5.57 In addition to those underlying the silts and clays, two further suites of Pleistocene sands and gravels were identified in this zone; a lower unit with a basal elevation of approximately -20m OD and a higher unit with its base at approximately -4.00 m OD (Figure 16).

5.58 Those at the lower elevation were present in southern part of this zone. They are stratigraphically equivalent to those at the base of Quaternary sequence in PQ Zone 9 (see above)

5.59 The upper fluvial sequence was only present in interventions at the very northern margin of the zone and is equivalent to that found in the southern part of PQ Zone 12a; this is discussed below.

Head

5.60 One intervention in this zone (BH09300) recorded 2.75 m of Head overlying fluvial sands and gravels. The Head comprised sandy silts and clays. These are principally colluvial deposits, mantling slopes at the distal end of a valley which joins East Tilbury Marshes in this area (Figure 15).

Holocene

Alluvium

5.61 Holocene alluvial deposits overlay Pleistocene deposits in interventions across much of this zone. However, there is a rapid increase in bedrock heights at the northern margin of the zone, where alluvial deposits generally directly overlay bedrock (Figure 16). The Holocene alluvial deposits comprised clays and silty clays, which were sometimes gravelly. A single well developed peat horizon was recorded in the northern part of the zone.

Peat

5.62 The peat identified in the north of the zone had a basal height of approximately -4.50 m OD (Figure 16) and may be broadly equivalent with peats found at a similar elevation in PQ Zone 8 and 9. The peat horizon in PQ Zone 10 ranged in thickness from 0.60-1.80 m (Table 27).

Head

5.63 The upper part of the Head sequence in BH09300 may include Holocene colluvium.

Table 27 – Peats in GI interventions in PQ Zone 10

GI Ref.	GI Phase	PQ Zone	Top of peat (m bgl)	Base of peat (m bgl)	Comments
BH08013	2	10	4.70	5.90	
BH08019	2	10	3.40	4.90	
BH08020	2	10	5.40	6.65	
BH08022	2	10	2.70	4.20	
BH08023	2	10	2.10	3.00	
WS08004	2	10	4.00	5.00	
BH08305	3	10	6.00	6.85	
BH08307	3	10	3.30	3.90	
BH08307	3	10	3.90	5.70	

Palaeoenvironmental samples

5.64 Bulk environmental samples were obtained through peat in this zone. The potential of these samples for assessment is summarized in Table 28.

Table 28 – Palaeoenvironmental samples from GI interventions in PQ Zone 10

GI Ref.	GI Phase	PQ Zone	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Potential for assessment
BH08014	2	10	4	20	9801405	Organic silty clay	?Alluvium	Low
BH08014	2	10	5	7	9801406	Organic silty clay	?Alluvium	Low
BH08022	2	10	6	8	9802206	Peat	Peat	Moderate
BH08022	2	10	7	8	9802206	Peat	Peat	Moderate
BH08022	2	10	8	8	9802206	Peat	Peat	Moderate

BH08305	3	10	90830501	20	0830505	Peat	Peat	Low (heavily disturbed)
BH08307	3	12a	9083074	10	9083074	Peat	Peat	Moderate
WS08004	3	10	80800401	2	0800403	Peat	Peat	Moderate

Archaeological evidence

5.65 No archaeological evidence was recovered from Phase 2 or 3 trial pits in this zone.

PQ Zone 11, Goshems Farm

5.66 No Phase 2 or Phase 3 GI interventions were carried out in this zone.

PQ Zone 12a, Shearwater Avenue

Introduction

5.67 Twenty Phase 2 and sixteen Phase 3 and GI intervention were in this zone (Figure 17). The Quaternary deposits encountered are summarized in Table 29 and discussed below.

Table 29 – GI interventions in PQ Zone 12a

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (m bgl)	Notes
BH08027	2	12a	-	-	
BH08027B	2	12a	-	-	
BH08029	2	12a	-	-	
BH09002	2	12a	Head	0.30-0.80	
			Alluvium	0.80-3.00	
			Fluvial Sands and Gravels	3.00-6.50	
BH09006	2	12a	Fluvial Sands and Gravels	3.00-6.50	
BH09010	2	12a	Head	0.30-0.90	
			Fluvial Sands and Gravels	0.90-5.80	
BH09011	2	12a	Head	0.30-0.80	
			Fluvial Sands and Gravels	0.80-5.50	
TP08002	2	12a	Fluvial Sands and Gravels	0.30-4.00+	
TP08003	2	12a	-	-	
TP08004	2	12a	-	-	
TP09002	2	12a	-	-	
TP09003	2	12a	-	-	
TP09009	2	12a	Fluvial Sands and Gravels	1.00-3.00+	
TP10001	2	12a	Head	0.25-0.60	
			Fluvial Sands and Gravels	0.60-3.00	
WS08005	2	12a	-	-	
WS08006	2	12a	-	-	

WS08028	2	12a	Head	0.30-1.70	
WS08038	2	12a	Head	0.20-1.28	
WS09005	2	12a	Head	0.40-0.65	
WS09008	2	12a	Head	0.45-5.00+	
WS09009	2	12a	Head	0.30-0.70	
		12a	Fluvial Sands and Gravels	0.70-2.35+	
WS09010	2	12a	Head	0.30-1.36	
			Head	1.36-4.42	
			Fluvial Sands and Gravels	4.42-5.00+	
WS09011	2	12a	Head	0.30-0.60	
			Fluvial Sands and Gravels	0.60-1.30+	
WS09012	2	12a	Fluvial Sands and Gravels	0.40-1.60+	
WS09013	2	12a	Head	0.40-1.64	
			Fluvial Sands and Gravels	1.64-4.60+	
BH08308	2	12a	Head	0.55-3.60	
			Fluvial Sands and Gravels	3.60-6.00+	
BH08309	2	12a	Fluvial Sands and Gravels	0.30-5.60+	
BH09302	2	12a	Head	0.40-4.80	
			Fluvial Sands and Gravels	4.80-5.55	
BH09305	2	12a	Fluvial Sands and Gravels	0.45-6.20	
BH09306	2	12a	Head	0.50-1.00	
			Fluvial Sands and Gravels	1.00-3.50	
BH09307	2	12a	Fluvial Sands and Gravels	0.55-5.90	
BH09308	2	12a	Fluvial Sands and Gravels	0.45-6.00	
BH09310	2	12a	Head	0.40-1.20	
			Fluvial Sands and Gravels	1.20-3.30	
BH09311	2	12a	Head	0.45-2.50	
			Fluvial Sands and Gravels	2.50-7.50	
BH10300	2	12a	Head	0.40-2.80	
			Fluvial Sands and Gravels	2.80-7.60	
TP09300	2	12a	Head	0.50-1.25	
			Alluvium	1.25-1.50	
			Fluvial Sands and Gravels	1.50-3.00+	

Pleistocene

Fluvial sands and gravels

- 5.68 Two groups of Pleistocene fluvial sediments with distinct basal heights have been identified in this zone (Figure 16).
- 5.69 Those at a lower elevation were found in the southern part of the zone, with basal heights of approximately -4.00 m OD; this is the northward continuation of deposits identified at the northern edge of PQ Zone 10 (see above). These sediments have been heavily impacted on by previous quarrying in the investigation area and were often heavily dissected by a later valley which has been incised through the deposits in this area (Figure 16). Where preserved, these fluvial sequences consisted of up to 5.40 m of generally high energy, fine to coarse, sub-angular to rounded flint gravel in a fine to coarse sand matrix; they were frequently overlain by Head deposits. Where the fluvial deposits are incised through by the later valley these Head sequences were over 3.00 m thick.
- 5.70 A separate set of fluvial deposits, with a higher basal elevation of approximately 4.00 m OD, were identified across the northern part of this zone. These deposits consisted of fluvial sands and gravels, and were up to 5.70 m thick. These sediments frequently fined upwards from sub-angular to sub-rounded, predominantly flint gravel in fine to coarse sand matrix, to fine to coarse sand with variable gravel content. The sequences reflect generally high energy fluvial deposition.

Head

- 5.71 Head deposits were frequently encountered overlying fluvial sands and gravels. These sequences were often shallow (<0.80 m) and reflected cryoturbation and colluvial/solifluction processes reworking the upper units of the fluvial sequences.
- 5.72 Deeper Head sequences, sometimes more than 3m thick, were recorded in northern (BH10300, WS09008) and southern parts of the zone (BH08308, BH09302). These are located along the margins of two north-south orientated valleys with join East Tilbury Marshes at the southern boundary of the zone (Figure 17).
- 5.73 The deeper Head sequences in the northern and southern parts of the zone exhibited stratigraphy suggestive of at least two phases of colluvial deposition; the northern interventions recorded yellowish-brown gravelly clays overlying yellowish red mottled silty sands, whilst those in the south recorded slightly clayey, slightly gravelly sands overlying silty, sometimes sandy, clays.

Holocene

Head

- 5.74 The Head sequences in this zone, particularly those within valleys, are likely to include Holocene colluvium.

Palaeoenvironmental samples

- 5.75 Three bulk samples were taken through fluvial sands and gravels in this zone; these are all coarse grained, high energy sediments and have low potential for palaeoenvironmental assessment (Table 30).

Table 30 – Palaeoenvironmental samples from GI interventions in PQ Zone 12a

GI Ref.	GI Phase	PQ Zone	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Potential for assessment
BH09305	3	12a	9093053	5	9093053	Sand and gravel	Fluvial sands and gravels	Low
BH09307	3	12a	9093074	5	9093074	Sand and gravel	Fluvial sands and gravels	Low
BH09308	3	12a	9093083	5	9093083	Sand and gravel	Fluvial sands and gravels	Low

Archaeological evidence

5.76 No archaeological evidence was recovered from Phase 2 or 3 trial pits in zone.

PQ Zone 12b, Sutton's Farm

5.77 No Phase 3 or Phase 2 GI interventions were carried out in this zone.

PQ Zone 13, Chadwell Saint Mary

Introduction

5.78 A total of 99 Phase 2 and 3 GI interventions were carried out in this zone (Figures 18); these were concentrated within the north-east of PQ Zone 13. They comprised:

- Phase 2: 21 boreholes and 2 trial pits, and
- Phase 3: 68 boreholes and 8 trial pits

5.79 The Quaternary deposits encountered are discussed below.

Pleistocene

Fluvial sands and gravels

5.80 The principal Quaternary sediments present in this zone were Pleistocene fluvial deposits. Fluvial sands and gravels were found at a consistent basal elevation of approximately 20m OD; these belong to a separate, higher terrace than terrace deposits found further south in PQ Zone 12a (Figure 19). The fluvial deposits in PQ zone 13 comprised sands and gravel, gravelly sands and gravelly sandy clays. Occasional finer grained silty clay horizons were noted during monitoring.

5.81 The fluvial sequences in this zone were overlain by shallow Head deposits, or a modern soil profiles; the fluvial sequences were generally less than 4.50 m thick. Deeper sequences, greater than 6.00 m and up to up to 9.60 m thick, were observed in the northern part of the zone, north and south of the junction between A13 and A1089 (Figure 20). These deeper sequences frequently comprised a basal, fine to coarse, sub-angular to rounded flint gravel in a fine to coarse sand matrix, overlain by alternating fine to coarse sand and sand and gravel units. These fluvial sequences reflect generally moderate to high energy deposition throughout.

Head

5.82 Head deposits, generally less than 1.00 m thick and comprising gravelly sandy clays, were frequently noted overlying fluvial sands and gravels. These are cryoturbated and reworked down-slope from the fluvial sequences through colluvial/solifluction processes. The thickest Head sequences tended to occur in the eastern part of the zone, along the margins of a valley incised into the Pleistocene terrace deposits. This valley (PQ Zone 15) runs from north-west to south-east between the south-east side of the Mar Dyke valley and the northwest side of the main Thames estuary.

Holocene

Head

5.83 The Head sequences overlying the Fluvial Sands and Gravels may include Holocene colluvium.

Palaeoenvironmental samples

5.84 Bulk samples taken through deposits in this zone are summarized in Table 31. These are generally, coarse fluvial sediments with low potential for assessment. One sample, a silty clay from the fluvial sequence in BH14302 has greater potential.

Table 31 – Palaeoenvironmental samples from GI interventions in PQ Zone 13

GI Ref.	GI Phase	PQ Zone	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Potential for assessment
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BH13009	2	13	9130091	2	91300903	Silty sand	Fluvial sands and gravels	Very low
BH13009	2	13	9130092	0.15	91300905	Sandy clay	Fluvial sands and gravels	Low (heavily disturbed)
BH12306	3	13	9123062	5	9123062	Sandy silt	Head	Low
BH13315	3	13	9133151	10	91331503	Gravelly sand	Fluvial sands and gravels	Low
BH13331	3	13	91333101	2	91333102	Gravelly clay	Head	Low
BH14302	3	13	9143021	1	91430205	Silty clay	Fluvial sands and gravels	Moderate
BH14335	3	13	91433501	10	91433503	Gravelly silty sand	Fluvial sands and gravels	Low
TP12300	3	13	123003	5	123003	Sand and gravel	Fluvial sands and gravels	Low
TP12301	3	13	123013	5	123013	Sand and gravel	Fluvial sands and gravels	Low
TP13308	3	13	133081	20	1330803	Sand	Fluvial sands and gravels	Low
TP14302	3	13	143021	20	1430203	Sand	Fluvial sands and gravels	Low
TP14302	3	13	143022	10	1430203	Sand	Fluvial sands and gravels	Low

Archaeological evidence

- 5.85 No significant archaeological material was identified during Phase 2 or Phase 3 monitoring in this zone.
- 5.86 Hand dug test pits were excavated in advance of boreholes in the Orsett Crop Mark Complex, located in the northern part of this zone (BH14329, BH14321, BH14335, BH14336, BH13449, BH15301, BH15302, BH15303, and WS15300); this work is reported on in HE540039-PCI-GEN-GEN-REP-GEO-00105; no significant archaeology was identified.

PQ Zone 14, Southfields

Introduction

- 5.87 Four Phase 2 and seven Phase 3 were in this zone, concentrated along the western-most edge (Figure 21).
- 5.88 The Quaternary deposits encountered are summarized in Table 32 and discussed below.

Table 32 – GI interventions in PQ Zone 14

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (mbgl)	Notes
BH11004	2	14	Head	0.20-1.70	
BH12011	2	14	-	-	
TP11004	2	14	Head	0.40-1.60	
WS12009	2	14	Head	0.30-3.77	
BH10312	3	14	Head	0.20-0.80	
BH11301	3	14	-	-	
BH12310	3	14	?Fluvial Sands and Gravels	0.70-3.60	
TP11300	3	14	Head	0.30-1.60	

WS12301	3	14	-	-	
WS12302	3	14	-	-	
WS12303	3	14	-	-	

Pleistocene

Fluvial sands and gravel

5.89 A single intervention (BH12310) recorded possible Pleistocene fluvial deposits; the area in which these occurred has been heavily impacted on by previous gravel extraction. The deposits overlay London Clay bedrock and comprised slightly gravelly sandy clay, overlain by gravelly fine to coarse sand; in total the sequence was 2.90 m thick. The gravel component comprised fine to medium, sub-angular to sub-rounded flint clasts. The limited lithological data indicates that these may be fluvial deposits, although deposition through colluvial or solifluction process cannot be excluded. If they are fluvial, the basal height suggests, that they are stratigraphically distinct from Fluvial Sands and Gravels identified in PQ Zone 13 (Figure 22)

Head

5.90 Relatively shallow Head sequences, generally less than 1.00 m thick and comprising sandy clays with a varying gravel content, were encountered in some interventions located on valley margins in this zone. The lithological characteristics of these deposits indicates they are primarily colluvial/solifluction deposits. A thicker Head sequence was noted in WS12009 (Figure 21); this was located in a side valley which joins the valley which runs through PQ Zone 15 (see below).

Holocene

Head

5.91 Head sequences in this zone may include Holocene colluvium.

Palaeoenvironmental samples

5.92 Two bulk samples from Head were taken in this zone (Table 33). These have been assessed as having low palaeoenvironmental potential.

Table 33 – Palaeoenvironmental samples from GI interventions in PQ Zone 14

GI Ref.	GI Phase	PQ Zone	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Potential for assessment
BH10312	3	14	9103123	5	9103123	Gravelly sand	Head	Low
TP11300	3	14	113004	5	113004	Sandy clay	Head	Low

Archaeological evidence

5.93 No archaeological evidence was recovered from the Phase 2 and 3 trial pits in this zone.

PQ Zone 15, Brook Farm Channel

Introduction

5.94 A total of forty-seven Phase 2 and 3 GI interventions were carried out in this zone (Figures 23). These are summarized below:

- Phase 2: 14 boreholes and 6 trial pits, and
- Phase 3: 23 boreholes and 4 trial pits

5.95 The Quaternary deposits encountered are summarized in Table 34 and discussed below.

Table 34 – GI interventions in PQ Zone 15

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (mbgl)	Notes
BH10003	2	15	Head	0.50-1.40	
			Fluvial Sands and Gravels	1.40-3.00	
BH10004	2	15	Head	0.15-1.20	
			Alluvium	1.20-3.50	
BH10008	2	15	Head	0.60-4.00	
BH11007	2	15	-	-	
BH12003	2	15	Head	0.30-1.20	
BH12018	2	15	Head	0.90-3.70	
			Fluvial Sands and Gravels	3.70-6.60	
BH14017	2	15	Fluvial Sands and Gravels	0.80-5.40	
TP10003	2	15	Head	0.40-1.00+	
TP10004	2	15	Head	0.30-3.00+	
TP10004A	2	15	Head	0.30-3.00+	
TP11001	2	15	Head	0.25-3.00+	
TP11002	2	15	Head	0.25-3.00+	
TP11005	2	15	Head	0.70-0.95+	
WS10002	2	15	Fluvial Sands and Gravels	0.70-1.72+	
WS10003	2	15	Head	0.40-0.65	
			Fluvial Sands and Gravels	1.20-1.60+	
WS10006	2	15	Head	0.40-1.20	
			Fluvial Sands and Gravels	1.20-2.50+	
WS11001	2	15	Head	0.30-2.17	
			Fluvial Sands and Gravels	2.17-2.90+	
WS11002	2	15	Head	0.40-0.80	
			Alluvium	0.80-1.00	
			Peat	1.00-1.35	
			Alluvium	1.35-1.79	
WS11005	2	15	Head	0.30-2.17	
			Fluvial Sands and Gravels	2.17-2.90+	
WS12004	2	15	Head	0.35-2.25	
			Fluvial Sands and Gravels	2.25-3.34	
BH10302	3	15	Head	0.10-2.10	
BH10303	3	15	Head	0.40-1.50	
			Fluvial Sands and Gravels	1.50-2.60	

BH10304	3	15	Head	0.60-1.00	
			Fluvial Sands and Gravels	1.00-2.70	
BH10305	3	15	Alluvium	0.30-2.10	
			Fluvial Sands and Gravels	2.10-3.30	
BH10306	3	15	Head	0.40-3.70+	
BH10306A	3	15	Head	0.40-4.20	
BH10307	3	15	Head	0.50-0.90+	
BH10307A	3	15	Head	0.50-0.60	
			Alluvium	0.60-1.90	
BH10308	3	15	-	-	
BH10309	3	15	Head	0.30-1.50	
			?Fluvial Sands and Gravels	1.50-5.10	
BH10310	3	15	Head	0.30-3.10	
BH10311	3	15	Head	0.30-4.00	
BH11305	3	15	Head	0.30-4.70	
BH12305	3	15	Head	0.40-1.65	
			Fluvial Sands and Gravels	1.65-2.60	
BH13333	3	15	Head	0.50-1.40	
BH13334	3	15	Fluvial Sands and Gravels	0.30-2.70	
BH13335	3	15	Head	0.00-1.10	
			Fluvial Sands and Gravels	1.10-6.00	
BH13337	3	15	Head	0.60-2.10	
			Fluvial Sands and Gravels	2.10-5.50	
BH13338	3	15	Head	0.40-3.70	
			Fluvial Sands and Gravels	3.70-6.50	
BH13339	3	15	Head	0.25-4.56	
TP10300	3	15	Head	0.50-1.30	
TP10301	3	15	Head	0.30-1.60	
TP13306	3	15	Head	0.30-2.70	
TP13307	3	15	Head	-	

Pleistocene

Fluvial Sands and Gravels

5.96 Fluvial sands and gravels were present in interventions in the southern, eastern and northern part of the zone. These deposits were generally truncated and overlain by Head deposits. The deposits comprised generally high energy sands and gravels and correlate with Pleistocene terrace deposits identified in PQ Zone 13 (Figure 22).

Head

5.97 This zone encompasses a valley which runs from north-west to south-east between the south-east side of the Mar Dyke valley and the north-west side of the main Thames estuary. GI data demonstrates that the

margins of this valley retain Head sequences which are up to 4.70 m thick. The deposits were composed of sandy silty clays and silty sands with variable gravel content. These sediments are characteristic of those deposited through colluvial and/or solifluction processes. Stratigraphy was apparent within the deeper Head sequences, which suggests that they reflect more than one period of deposition. The Head deposits often overlay, and post-date, Pleistocene fluvial sands and gravels.

Holocene

Alluvium

5.98 Holocene alluvial deposits are present in interventions in the southern part of this zone (BH10004, WS11002, BH10305 and BH10307A). These alluvial deposits consisted of silty clays and belong to a tributary valley which runs through Linford and joins the main Thames floodplain in East Tilbury Marshes (Figure 23)

Peat

5.99 A 0.35 m thick peat, situated between alluvial clay units, was recorded within the alluvial sequence in WS11002.

Head

5.100 Head deposits comprised sandy colluvial clays overlay Holocene alluvium in WS11002; their stratigraphic context demonstrates that these are Holocene colluvial deposits. The upper parts of Head sequences along valley margins are also likely to include Holocene colluvium.

Palaeoenvironmental samples

5.101 One bulk sample was taken from Head deposits in this zone (Table 35); this has low potential for palaeoenvironmental assessment. WS11002, which recorded a peat within an alluvial sequence, was not geoaerologically monitored.

Table 35 – Palaeoenvironmental samples from GI interventions in PQ Zone 15

GI Ref.	GI Phase	PQ Zone	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Potential for assessment
TP13306	3	15	1339061	10	1330603	Silty clay	Head	Low

Archaeological evidence

5.102 One undiagnostic flint flake was recovered from the modern soil profile in TP10301 during Phase 3 monitoring.

PQ Zone 16, Loft Hall Farm

Introduction

5.103 Four Phase 2 and eight Phase 3 GI interventions were in this zone, concentrated in the south (Figure 24).

5.104 Quaternary deposits were only encountered in six interventions; these deposits are summarized in Table 36 and discussed below.

Table 36 – GI interventions in PQ Zone 16

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (m bgl)	Notes
BH12012	2	16	Head	0.30-0.80	
BH12020	2	16	Head	0.80-2.80	
WS12016	2	16	Head	0.35-1.20	
WS12021	2	16	Head	0.30-0.90	
BH12314	3	16	Head	0.30-2.30	

BH12316	3	16	None	-	
BH13346	3	16	None	-	
BH13347	3	16	None	-	
BH13348	3	16	None	-	
BH13350	3	16	None	-	
BH13351	3	16	None	-	
BH13352	3	16	Head	0.80.1.80	

Pleistocene

Head

5.105 Interventions in the southern part of this zone recorded Head sequences up to up to 2.00 m thick. These sediments consisted of gravelly sandy clays and clayey sands. The gravelly component included clasts likely to be reworked from adjacent Pleistocene fluvial and Paleogene marine deposits. The lithological characteristics suggests that these clays and sands were primarily deposited through colluvial/solifluction sequences. Stratigraphy present within the deeper sequences is indicative of more than one phase of deposition.

Holocene

Head

5.106 The upper parts of the colluvial sequences in this zone may include Holocene colluvium.

Palaeoenvironmental samples

5.107 No deposits with palaeoenvironmental potential were identified in this zone.

Archaeological evidence

5.108 No Phase 2 or 3 trial pits were excavated in this zone.

PQ Zone 17, Cuckoo Lane

5.109 No Phase 2 or Phase 3 GI interventions were carried out in this zone.

PQ Zone 18, Mederbridge Road (Ockendon Loop)

5.110 No Phase 2 or Phase 3 GI interventions were carried out in this zone.

PQ Zone 19, Kemps Farm, Dennis Road and Manor Farm

Introduction

5.111 Thirteen Phase 3 interventions were in this zone, concentrated in the east (Figure 25).

5.112 The Quaternary deposits encountered are summarized in Table 37 and discussed below.

Table 37 – GI interventions in PQ Zone 19

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (m bgl)	Notes
BH16316	2	19	Head	0.20-1.60	
			Sands and gravels	1.60-5.90	

			Silts and clays	5.90-10.20	
			Sands and gravels	10.20-11.40	
BH20301	2	19	Sands and gravels	2.50-4.55	
			Silts and clays	4.55-7.05	
			Sands and gravels	7.05-8.70	
BH21301	2	19	Head	0.30-0.50	
			Sands and gravels	0.50-8.80	
			Silts and clays	8.80-16.10	
BH21302	2	19	Head	0.35-0.80	
			Sands and gravels	0.80-8.50	
			Silts and clays	8.50-14.20	
			Sands and gravels	14.20-14.80	
BH21303	3	19	Head	0.45-1.10	
			Sands and gravels	1.10-5.30	
			Silts and clays	5.30-9.80	
			Sands and gravels	9.80-10.00	
BH21306	3	19	Head	0.35-2	
			Sands and gravels	0.50-14.70	
			Silts and clays	7.10-14.40	
			Sands and gravels	14.40-14.70	
BH21307	3	19	Head	0.35-0.80	
			Sands and gravels	0.80-8.95	
			Silts and clays	8.95-15.35	
			Sands and gravels	15.35-15.45	
BH21309	3	19	Head	0.35-1.30	
			Sands and gravels	1.30-2.90	
			Silts and clays	2.90-5.70	
			Sands and gravels	5.70-6.40	
BH21312	3	19	Sands and gravel	1.60-10.15	
BH21313	3	19	Head	0.20-0.65	
			Sands and gravels	0.65-10.50	
			Silts and clays	10.50-16.90	
BH21325	3	19	Head	0.00-2.10	
			Sands and gravels	2.10-7.20	
			Silts and clays	7.20-13.80	
			Sands and gravels	13.80-14.60	
BH21331	3	19	Sands and gravels	0.30-11.75	
			Silts and clays	6.60-10.70	
			Sands and gravels	10.70-11.75	
BH21379	3	19	Head	0.30-0.50	
			Sands and gravels	0.50-4.90	
			Silts and clays	4.90-9.30	
			Sands and gravels	9.30-10.00	

Pleistocene

Fluvial deposits

- 5.113 Thick Pleistocene fluvial sequences were present within GI interventions located in the eastern part of this zone; these sequences regularly extended to 15 m in depth. The upper units consisted of gravelly sands and fine to medium sandy, clays sands and silty sands, which sometimes exhibit horizontal bedding structures and laminations. The lower units comprised relatively thick coarse gravelly sands overlain by fine grained silts and clays. The silts and clays frequently included units preserving organic material, including visible plant and wood fragments.
- 5.114 Cross-sections demonstrate that the organic silts and clays are within a channel (Figures 26–28). This channel can be traced through the central and northern part of the zone, straddling the boundary with PQ Zone 26 (Figure 29).

Head

- 5.115 Head deposits comprising gravelly clays overlay the fluvial deposits in this zone. This Head is the cryoturbated and reworked (through colluvial and or solifluction processes) upper part of the underlying fluvial stratigraphy.

Holocene

Head

- 5.116 Head deposits in this zone may include Holocene colluvium.

Palaeoenvironmental samples

- 5.117 Bulk samples were taken throughout the fluvial sequences in this zone (Table 38). Those from the upper parts of the sequences are generally coarse grained and have low potential for assessment. Samples from the lower fine grained organic silts and clays within the channel have high potential and may preserve pollen, plant macrofossils, micro-fossil and vertebrates.

Table 38 – Palaeoenvironmental samples from GI interventions in PQ Zone 19

GI Ref.	GI Phase	PQ Zone	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Potential for assessment
BH16316	3	19	91631601	10	91631604	Gravelly sand	Sands and gravels	Low
BH16316	3	19	91631602	5	91631605	Organic clay sand	Silts and clays	High
BH16316	3	19	91631603	5	91631605	Silty clay	Sands and gravels/ London Clay	Low
BH21302	3	19	92130201	2	92130202	Gravelly clay	Head	Low
BH21302	3	19	92130202	2	92130203	Gravelly clay	Sands and gravels	Low
BH21302	3	19	92130203	2	92130203	Gravelly clay	Sands and gravels	Low
BH21302	3	19	92130204	1	92130204	Sand	Sands and gravels	Low (very disturbed)
BH21302	3	19	92130205	1	92130205	Gravelly sand	Sands and gravels	Low
BH21302	3	19	92130206	1	92130205	Gravelly sand	Sands and gravels	Low
BH21302	3	19	92130207	1	92130206	Organic silty clay	Silts and clays	High
BH21302	3	19	92130208	4	92130206	Organic silty clay	Silts and clays	High

BH21302	3	19	92130209	10	92130206	Organic silty clay	Silts and clays	High
BH21303	3	19	92130301	8	92130206	Organic sandy clay	Silts and clays	High
BH21307	3	19	92130701	2	92130703	Sandy clay	?Head	Low
BH21309	3	19	9213091	18	9213096	Organic silty clay	Silts and clays	High

5.118 Sequences from three Phase 3 cores have been identified which, although not recorded, should be present at the logging facility and which include organic fluvial silts and clays with high palaeoenvironmental potential (Table 39)

Table 39 – Phase 3, PQ Zone 19 core lengths in logging facility with paleoenvironmental potential

GI Ref.	GI Phase	PQ Zone	Core lengths (m)	Stratigraphy	Comments
BH21307	3	19	7.00-14.50	Fluvial silts and clays	Not recorded
BH21313	3	19	10.50-17.00	Fluvial silts and clays	Not recorded
BH21325	3	19	7.00-14.00	Fluvial silts and clays	Not recorded

Archaeological evidence

5.119 No Phase 2 or 3 trial pits were excavated in this zone.

PQ Zone 20a, Green Lane, east side of Mar Dyke basin

Introduction

5.120 Sixteen Phase 2 and twenty-eight Phase 3 interventions were in this zone (Figure 30). The Quaternary deposits encountered are discussed below.

Pleistocene

Fluvial Sands and Gravels

5.121 One intervention (TP15301) identified 0.50 m of fluvial sands and gravel beneath gravelly colluvial clays. This intervention was located close to the southern boundary of this zone (Figure 30) and these fluvial sands and gravel are the feather edge of Pleistocene terrace deposits in PQ Zone 13.

Head

5.122 Head deposits overlying London Clay bedrock were recorded across this zone. These Head sequences were generally less than 1.00 m thick and comprise gravelly clays deposited through colluvial/solifluction processes.

Holocene

Head

5.123 Head deposits in this zone may include Holocene colluvium.

Alluvium

5.124 One intervention at the northern boundary of the zone (BH16306), situated along the southern edge of the Mar Dyke floodplain (Figure 30), contained 0.90 m of alluvial, slightly gravelly silty clays beneath a modern soil profile and overlying London Clay bedrock. This is Holocene alluvium of the Mar Dyke.

Palaeoenvironmental samples

5.125 No deposits with palaeoenvironmental potential were identified in this zone and no samples were taken.

Archaeological evidence

5.126 No archaeological evidence was identified in Phase 2 or 3 trial pits in this zone.

PQ Zone 20b, Castle's Grove, east side of Mar Dyke basin

Introduction

5.127 Two Phase 2 and two Phase 3 interventions were in this zone (Figure 31). The Quaternary deposits encountered are summarized in Table 40 and discussed below.

Table 40 – GI interventions in PQ Zone 20b

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (mbgl)	Notes
TP17002	2	20b	Head	0.20-0.80	
WS16003	2	20b	Head	0.20-1.70	
TP17300	3	20b	Head	0.40-1.30	
TP17301	3	20b	Head	0.30-1.10	

Pleistocene

Head

5.128 Head deposits up to 1.70 m thick were recorded in all four interventions. These sediments consisted of stiff slightly gravelly, slightly sandy clay, which represents colluvial reworked and/or soliflucted material, primarily derived from the London Clay bedrock.

Holocene

Head

5.129 Head deposits recorded in interventions in this zone could include Holocene colluvium.

Palaeoenvironmental samples

5.130 No deposits with palaeoenvironmental potential were identified in this zone and no samples were taken.

Archaeological evidence

5.131 No archaeological evidence was identified in Phase 2 or 3 trial pits in this zone.

PQ Zone 20c, Bulphan, east side of Mar Dyke basin

5.132 No Phase 2 or Phase 3 GI interventions were carried out in this zone.

PQ Zone 21, Mar Dyke narrows

5.133 No Phase 2 or Phase 3 GI interventions were carried out in this zone.

PQ Zone 22a, Mar Dyke Basin, main (Fen Farm)

Introduction

5.134 A total of 36 Phase 2 and 3 GI interventions were carried out in this zone (Figures 32). These are summarized below:

- Phase 2: 12 boreholes and 6 trial pits, and
- Phase 3: 24 boreholes

5.135 The Quaternary deposits encountered are discussed below.

Pleistocene

Head

5.136 Head deposits were present in interventions across this zone. These deposits were generally less than 1.00 m thick and consisted of stiff clays with a variable sand and gravel content. This is colluvial material primarily reworked from the London Clay bedrock.

Holocene

Head

5.137 Head deposits in this zone may include Holocene colluvial sediments.

Alluvium

5.138 Although mapped as more widespread by the BGS, GI data suggests that Holocene alluvium is principally confined to margins of the current Mar Dyke (Figure 33). In GI interventions these alluvial deposits overlay London Clay bedrock and generally range from 1.00-2.00 m in thickness; occasionally up to 4.00 m of alluvium was recorded. The alluvial sequences comprised slightly sandy silty clays, sometimes with a slight gravel component. No peats were identified.

Palaeoenvironmental samples

5.139 Two bulk samples were taken during GI monitoring in this zone; neither has significant potential for assessment (Table 41).

Table 41 – Palaeoenvironmental samples from GI interventions in PQ Zone 22a

GI Ref.	GI Phase	PQ Zone	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Potential for assessment
TP17005	2	22a	170051	2	170053	Slightly organic alluvium	Alluvium	Low
BH17306	3	22a	91730601	10	91730603	Sandy clay	Head	Low

Archaeological evidence

5.140 No archaeological evidence was identified in Phase 2 or 3 trial pits in this zone.

PQ Zone 22b, Mar Dyke Basin, northwest (Puddle Dock)

Introduction

5.141 Ten Phase 3 interventions were in this zone (Figure 34). The Quaternary deposits encountered are summarized in Table 42 and discussed below.

Table 42 – GI interventions in PQ Zone 22b

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (mbgl)	Notes
BH21341	3	22b	Head	0.30-0.90	
BH21342	3	22b	Head	0.40-1.20	
			Alluvium	1.20-2.30	
BH21344	3	22b	None	-	
BH21344A	3	22b	None	-	
TP21303	3	22b	Head	0.30-1.80	
TP21304	3	22b	Head	0.30-1.00	
WS21305	3	22b	Head	0.30-0.60	
WS21307	3	22b	Head	0.35-1.00	
WS21308	3	22b	Head	0.35-1.00	
WS21311	3	22b	Head	0.25-0.50	

Pleistocene

Head

5.142 Head deposits, generally less than 1.00 m thick and overlying London Clay bedrock, were identified in this zone. These are stratigraphically analogous with the colluvial/soliflucted deposits identified across the Mar Dyke basin (PQ Zones 20–24).

Holocene

Alluvium

5.143 An alluvial sequence 0.90 m thick, overlying London clay bedrock, was encountered in BH21342. This comprised mottled light bluish grey slightly sandy silty alluvial clays, with occasional pockets of organic material, overlying a yellowish-brown clay sandy gravel, composed of angular, sub-angular and sub-rounded flints clasts.

Head

5.144 Slightly gravelly clays overlay Holocene alluvial deposits in one borehole (BH21342); these are Holocene colluvium. This demonstrates that the colluvial Head deposits in this zone, and likely elsewhere across the Mar Dyke basin, include Holocene units.

Palaeoenvironmental samples

5.145 No deposits with palaeoenvironmental potential were identified in this zone and no samples were taken.

Archaeological evidence

5.146 No archaeological evidence was identified in Phase 2 or 3 trial pits in this zone.

PQ Zone 23a, Mar Dyke, eastern margin (Orsett Fen, Hobletts)

Introduction

5.147 A total of 29 Phase 2 and 3 GI interventions were carried out in this zone (Figures 35). These are summarized below:

- Phase 2: 14 boreholes and 1 trial pit, and
- Phase 3: 14 boreholes

5.148 The Quaternary deposits encountered are discussed below.

Pleistocene

Head

5.149 As across the Mar Dyke basin, shallow Head sequences were present in interventions across this zone. These were generally less than 1.00 m thick and consisted of often sandy, and sometimes gravelly, colluvial clays. These deposits generally overlay London Clay bedrock, but in several instances were above Holocene colluvium; this demonstrates that these Head deposits include a significant Holocene component.

Holocene

Alluvium

5.150 Holocene alluvial deposits are well represented in this zone, present in GI locations within the floodplain of the Mar Dyke (Figure 36). These alluvial sequences ranged up to 4.74 m in thickness and were composed of silts and silty clays, with peats present in some interventions.

Peat

5.151 Peats were recorded in five interventions within alluvial sequences in this zone, ranging between 0.20 and 0.40 m in thickness (Table 43).

Table 43 – Peats in GI interventions in PQ Zone 23a

GI Ref.	GI Phase	PQ Zone	Top of peat (mbgl)	Base of peat (mbgl)	Comments
OH16001	2	23a	1.20	1.42	
OH16004	2	23a	1.25	1.52	
OH16004A	2	23a	0.70	1.20	
BH16308	3	23a	0.90	1.30	
BH16311	3	23a	0.90	1.30	

Head

5.152 Two interventions recorded Head deposits overlying Holocene alluvium (BH16313 and WS16009). These comprised slightly gravelly sandy clays representing Holocene colluvial deposits.

Palaeoenvironmental samples

5.153 Bulk samples were taken from peats in two boreholes in this zone. These samples are summarized in Table 44.

Table 44 – Palaeoenvironmental samples from GI interventions in PQ Zone 23a

GI Ref.	GI Phase	PQ Zone	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Potential for assessment
WS16005	2	23a	8160051	2	81600503	Peat	Peat	Moderate
WS16009	2	23a	8160091	2	81600903	Peat	Peat	Moderate
WS16009	2	23a	8160091	2	81600903	Peat	Peat	Moderate

Archaeological evidence

5.154 No archaeological evidence was identified in Phase 2 or 3 trial pits in this zone.

PQ Zone 23b, Mar Dyke, eastern margin (Stringcock Fen)

5.155 No Phase 2 or Phase 3 GI interventions were carried out in this zone.

PQ Zone 24, West side of Mar Dyke basin, east of South Ockendon Hall

Introduction

5.156 One Phase 2 and twelve Phase 3 interventions were in this zone (Figure 37). The Quaternary deposits encountered are summarized in Table 45 and discussed below.

Table 45 – GI interventions in PQ Zone 24

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (mbgl)	Notes
WS18002	2	24	Head	0.35-1.10	
BH18303	3	24	Head	0.25-1.50	
BH19303	3	24	None		
BH19306	3	24	Head	0.40-2.10	
BH19307	3	24	Head	0.35-1.30	
BH19308	3	24	Head	0.35-0.70	
BH19310	3	24	Head	0.35-1.10	
BH21336	3	24	None	-	
BH21337	3	24	Head	0.65-1.20	
BH21338	3	24	None	-	
BH21339	3	24	Head	0.20-0.90	
TP19302	3	24	Head	0.40-1.00	
TP19303	3	24	Head	0.40-1.10	

Pleistocene

Head

5.157 Interventions in this zone generally encountered Head deposits beneath a modern soil profile. These Head deposits comprised slight sandy, slightly gravely dense clays, and are colluvial/solifluction deposits. These sediments were shallow, being generally less than 1.00 m deep.

Holocene

Head

5.158 The Head sequences in this zone may include Holocene colluvium.

PQ Zone 25, Hall Farm

Introduction

5.159 A total of 29 Phase 2 and 3 GI interventions were carried out in this zone (Figures 38). These were:

- Phase 2: 14 boreholes and 1 trial pit, and
- Phase 3: 14 boreholes

5.160 The Quaternary deposits encountered are discussed below.

Pleistocene

Fluvial Sands and Gravels

5.161 The principal Quaternary sediments recorded in this zone are Pleistocene fluvial sands and gravels.

- 5.162 Two sets of fluvial deposits with distinct basal elevations have been identified in this zone (Figures 26–28). The upper, with a basal elevation at approximately 20 m OD, is the northward continuation of equivalent deposits in PQ Zone 13. The lower sets of deposits, with a basal elevation between approximately 12 to 4 m OD, are the eastwards lateral continuation of deposits in PQ Zone 19.
- 5.163 The upper sediments comprised sands and gravels and sandy gravels, which often fined upwards through the sequences. They were up to 6.00 m thick and are mostly coarse grained, generally reflecting high energy deposition.
- 5.164 The lower fluvial sequences are found in the western part of this zone and are stratigraphically equivalent to those in PQ Zone 19. The upper parts of these sequences comprised fluvial gravelly sands and fine to medium sandy, clays sands and silty sands, which sometimes exhibited horizontal bedding structures and laminations. In the eastern-most interventions, these upper units overlay London Clay bedrock (Figures 27–29). However, in the western most interventions organic, fine grained channel fills are apparent, equivalent to those in PQ Zone 19 (Table 46; Figure 29)

Table 46– GI interventions in PQ Zone 25 recording silts and clays beneath sands and gravels

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (m bgl)	Notes
BH21304	3	25	Head	0.35-1.10	
			Sands and gravels	1.10-11.40	
			Silts and clays	11.40-16.00	
			Sands and gravels	16.00-16.30	
BH21305	3	25	Sands and gravels	0.45-14.50	
			Silts and clays	12.20-14.20	
			Sands and gravels	14.20-14.50	
BH21308	3	25	Head	0.90-0.90	
			Sands and gravels	0.90-11.80	
			Silts and clays	11.80-16.25	
BH21310	3	25	Sands and gravels	2.70-12.75	
			Silts and clays	12.75-18.50	
BH21311	2	25	Head	0.35-0.90	
			Sands and gravels	0.90-13.10	
			Silts and clays	13.10-16.50	
			Sands and gravels	16.50-16.80	
BH21314	3	25	Head	0.20-0.55	
			Sands and gravels	0.55-11.15	
			Silts and clays	11.15-17.80	
			Sands and gravels	17.80-17.90	
BH21316	3	25	Head	0.30-0.80	
			Sands and gravels	0.80-19.10	
			Silts and clays	13.65-18.85	
			Sands and gravels	18.85-19.10	
BH21318	3	25	Head	0.30-0.90	
			Sands and gravels	0.90-11.60	
			Silts and clays	11.60-15.70	
			Sands and gravels	15.70-17.05	
BH21319	3	25	Head	0,35-1.30	

			Sands and gravels	1.30-5.70	
			Silts and clays	2.90-5.70	
			Sands and gravels	5.70-6.40	
BH21321	3	25	Head	0.30-0.70	
			Sands and gravels	0.70-16.60	
			Silts and clays	10.70-16.00	
			Sands and gravels	16.00-16.60	

Head

5.165 Head deposits comprising sandy gravelly clays overlay the Pleistocene fluvial deposits in this zone. The lithology of these deposits suggest that these are primarily colluvial deposits. These Head sequences ranged up to approximately 2.00 m in thickness.

5.166 The thicker sequences were in interventions within a valley which has incised through the fluvial deposits in the southern part of the zone (BH2003, Bh20305, BH20307, BH21333, OH19002, OH19002A, TP19300 and TP19301). This reflects material being colluvial reworked/soliflucted down these valley slopes. Shallower sequences directly overlay the fluvial deposits; these sediments are cryoturbated and reworked (through colluvial/solifluction processes) fluvial sediments.

Holocene

Head

5.167 The Head sequences, particularly thicker accumulations situated within a valley in the southern part of the zone, are likely to include Holocene colluvial deposits.

Palaeoenvironmental samples

5.168 Bulk samples were taken from throughout the fluvial sequences identified during monitoring. The potential of these for palaeoenvironmental assessment has been considered and is summarized in Table 47.

Table 47– Palaeoenvironmental samples from GI interventions in PQ Zone 25

GI Ref.	GI Phase	PQ Zone	Sample number	Sample size (litres)	Context number	Lithology	Stratigraphy	Potential for assessment
BH19300	3	25	91930001	10	1930002	Gravelly clay	Head	Low
BH19300	3	25	91930002	1	1930003	Gravelly sand	Sands and gravels	Low
BH19300	3	25	91930003	5	1930003	Gravelly sand	Sands and gravels	Low
BH19300	3	25	91930004	5	1930003	Gravelly sand	Sands and gravels	Low
BH19304	3	25	91930001	10	1930004	Gravelly sand	Sands and gravels	Low
BH20302	3	25	92030201	1	92030202	Gravelly clay	Head	Low
BH20302	3	25	92030202	1	92030203	Gravelly clay	Sands and gravels	Low
BH20302	3	25	92030203	1	92030204	Gravelly sand	Sands and gravels	Low
BH21300	3	25	92130001	2	92130003	Sandy clay	Sands and gravels	Moderate
BH21300	3	25	92130002	2	92130004	Clay sand	Sands and gravels	Moderate
BH21304	3	25	92130401	2	92130403	Sandy clay	Sands and gravels	Moderate
BH20311	3	25	92031101	10	92031103	Gravelly sand	Head	Low

BH20311	3	25	92031102	8	92031104	Gravelly sand	Sands and gravels	Low
BH20311	3	25	92031103	1	92031104	Gravelly sand	Sands and gravels	Low
BH20311	3	25	92031104	1	92031105	Clay sand	Sands and gravels	Moderate
BH20311	3	25	92031105	10	92031105	Clay sand	Sands and gravels	Moderate
BH20315	3	25	92031501	1	92031503	Gravelly sand	Sands and gravels	Low
BH20315	3	25	92031502	9	92031503	Gravelly sand	Sands and gravels	Low
BH21324	3	25	92132401	8	92132403	Gravelly clay	Head	Low
BH21324	3	25	92132402	2	92132405	Clay sand	Sands and gravels	Moderate
BH21324	3	25	92132403	2	92132406	Clay sand	Sands and gravels	Moderate
BH21324	3	25	92132404	2	92132406	Gravelly sand	Sands and gravels	Low
BH21378	3	25	92137801	10	92137802	Gravelly clay	Head	Low
BH21378	3	25	92137802	6	92137803	Sandy clay	Sands and gravels	Moderate
BH21378	3	25	92137803	10	92137804	Sandy clay	Sands and gravels	Moderate
BH21378	3	25	92137804	8	92137804	Sandy clay	Sands and gravels	Moderate
BH21378	3	25	92137805	1	92137805	Sandy clay	Sands and gravels	Moderate
BH21378	3	25	92137806	10	92137807	Sand and clay	Sands and gravels	Moderate
BH21378	3	25	92137807	1	92137808	Sand and gravel	Sands and gravels	Low
TP21300	3	25	2130001	2	2130003	Clayey sand	Sands and gravels	Low
TP21300	3	25	2130002	2	2130004	Sand	Sands and gravels	Low

5.169 Sequences from three Phase 3 cores have been identified at the logging facility which include organic fluvial silts and clays with high palaeoenvironmental potential (Table 48); cores from four additional cores, not recorded but which should be present at the facility, also include such deposits.

Table 48 – Phase 3, PQ Zone 7 core lengths in logging facility with paleoenvironmental potential

GI Ref.	GI Phase	PQ Zone	Core lengths (m)	Stratigraphy	Comments
BH21305	3	25	12.00-14.50	Fluvial silts and clays	
BH21308	3	25	11.50-16.50	Fluvial silts and clays	
BH21310	3	25	12.50-18.50	Fluvial silts and clays	Not recorded
BH21311	3	25	13.00-16.50	Fluvial silts and clays	Not recorded
BH21314	3	25	11.00-18.00	Fluvial silts and clays	Not recorded

BH21316	3	25	7.00-14.00	Fluvial silts and clays	
BH21318	3	25	11.50-16.00	Fluvial silts and clays	Not recorded

Archaeological evidence

5.170 No archaeological evidence was identified in Phase 2 or 3 trial pits in this zone.

PQ Zone 26, White Post Farm

5.171 No Phase 2 or Phase 3 GI interventions were carried out in this zone.

PQ Zone 27, Mar Dyke, northern edge

Introduction

5.172 Two Phase 2 and fifty-two Phase 3 interventions were in this zone (Figure 39). The Quaternary deposits encountered are summarized in Table 49 and discussed below.

Table 49 – GI interventions in PQ Zone 27

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (mbgl)	Notes
WS21010	2	27	Head	0.60-1.50+	
WS21013	2	27	-	-	
BH21346	3	27	None	-	
BH21347	3	27	Head	2.50-3.15	
BH21348	3	27	Head	7.80-8.60	
BH21349	3	27	Head	0.40-1.00	
BH21350	3	27	Head	7.45-9.70	
BH21351	3	27	None	-	
BH21352	3	27	Head	7.70-10.70	
BH21353	3	27	Head	9.20-10.75	
BH21354	3	27	Head	9.95-11.30	
BH21355	3	27	Head	2.45-4.15	
BH21356	3	27	Head	0.20-0.90	
BH21357	3	27	None	-	
BH21358	3	27	Head	10.70-11.90	
BH21359	3	27	Head	15.80-18.45	
BH21360	3	27	Head	11.15-12.90	
BH21361	3	27	Head	9.75-13.00	
BH21362	3	27	None	-	
BH21363	3	27	Head	0.30-2.70	
BH21364	3	27	None	-	
BH21365	3	27	None	-	
BH21365A	3	27	None	-	
BH21365B	3	27	None	-	
BH21366	3	27	Head	1.95-4.15	

BH21367	3	27	None	-	
BH21368	3	27	Head	3.00-4.35	
BH21369	3	27	Head	1.20-2.80	
BH21370	3	27	Head	2.50-2.70	
BH21370A	3	27	None	-	
BH21371	3	27	Head	9.05-10.07	
BH21372	3	27	Head	10.50-12.05	
BH21373	3	27	None	-	
BH21374	3	27	None	-	
BH21375	3	27	None	-	
BH21380	3	27	Head	0.65-0.85	
BH21380A	3	27	None	-	
TP21305	3	27	Head	0.30-0.90	
WS21310	3	27	Head	0.60-1.50	
WS21312	3	27	None	-	
WS21313	3	27	Head	0.35-0.70	
WS21315	3	27	Head	1.40-4.20	
WS21316	3	27	Head	0.30-2.20	
WS21318	3	27	None	-	
WS21318A	3	27	None	-	
WS21318B	3	27	None	-	
WS21318C	3	27	None	-	
WS21319	3	27	None	-	
WS21320	3	27	None	-	
WS21322	3	27	None	-	
WS21323	3	27	Head	0.70-1.20	
WS21324	3	27	Head	0.70-1.85	
WS21328	3	27	Head	0.30-1.25	
WS21329	3	27	Head	0.40-0.80	

Pleistocene

Head

5.173 Interventions in this zone sporadically encountered Head sequences, generally less than 1.00 m thick but ranging up to 3.00 m in thickness. Along the M25 these Head deposits were present beneath thick sequences of made ground associated with the motorway construction (often more than 10m). The Head sequences comprised sandy gravelly clays which reflect colluvial and/or solifluction processes reworking earlier Pleistocene deposits and bedrock material.

Holocene

Head

5.174 The Head sequences in this zone may include Holocene colluvium.

PQ Zone 28, Foxburrow Wood

5.175 Three Phase 3 interventions were located at the southern end of this zone (Figure 40, Table 50). All three interventions recorded made ground over London Clay bedrock.

Table 50 – GI interventions in PQ Zone 28

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (mbgl)	Notes
WS21010	3	28	None	-	
WS21013	3	28	None	-	
BH21346	3	28	None	-	

PQ Zone 29, Park Pale

Introduction

5.176 Seven Phase 2 and three Phase 3 interventions were in this zone (Figure 41). The Quaternary deposits encountered are summarized in Table 51 and discussed below.

Table 51 – GI interventions in PQ Zone 29

GI Ref.	GI Phase	PQ Zone	Quaternary deposits	Depth of Quaternary deposits (m bgl)	Notes
BH01001	2	29	Head	3.65-5.10	
BH01003	2	29	None	4.70-7.40	
TP01001	2	29	None	-	
TP01002	2	29	Head	0.75-1.25	
TP01003	2	29	None	-	
TP01004	2	29	None	-	
WS01005	2	29	Head	0.30-1.80	
WS01303	3	29	None	-	
WS01304	3	29	Head	0.20-0.50	
WS01305	3	29	None	-	

Pleistocene

Head

5.177 Head sequences associated with a south-west to north-east trending dry valley were present in this zone (Figure 41). These sequences were generally less than 1.00 m thick and comprised sandy clays, with a variable gravel content; this gravel component consisted of angular to rounded flint clasts, including marine pebbles reworked from Paleogene deposits.

Holocene

Head

5.178 The upper parts of the Head sequence within the dry valley may include Holocene colluvium.

Palaeoenvironmental samples

5.179 No deposits with palaeoenvironmental potential were identified in this zone and no samples were taken.

Archaeological evidence

5.180 No archaeological evidence was identified in Phase 2 or 3 trial pits in this zone.

6. Discussion

Introduction

- 6.1 The results of archaeological and geoarchaeological monitoring of Phase 2 and 3 GI monitoring are discussed together. The discussion is framed with the PQ zones outlined in the PQDM (Wenban-Smith and Bates 2020). This discussion refers to information provided in the PQDM, and references other sources as appropriate.
- 6.2 No significant archaeology was identified during monitoring. Consequently, the discussion is focussed on the geoarchaeological potential of the Quaternary deposits encountered.

PQ Zone 1, Ebbsfleet Valley, HS 1 Car Park

- 6.3 PQ Zone 1 is within a backfilled chalk quarry. Quaternary deposits are thought to be absent from area potentially impacted on by the LTC works (Wenban-Smith 1995, Scott 2011, Wenban-Smith and Bates 2020). No Phase 2 or Phase 3 GI interventions were carried out in this zone.

PQ Zone 2, Ebbsfleet Valley

- 6.4 PQ Zone 2 is located within the Ebbsfleet Valley, in an area which late Middle Pleistocene colluvial and fluvial deposits with palaeoenvironmental and Lower Palaeolithic archaeological potential may be present (Wenban-Smith 2013). No Phase 2 or Phase 3 GI interventions were carried out in this zone.

PQ Zone 3, Ebbsfleet Valley (upland catchment)

Pleistocene

- 6.5 Three Phase 3 GI interventions were in this zone, one of which (WS01315) identified colluvial clays, overlying chalky solifluction deposits. These sediments are in a south-north orientated dry valley (Figure 5). The colluvial clays have low palaeoenvironmental potential. The chalky solifluction deposits have the potential to preserve molluscs and vertebrates; unless buried landsurfaces are present, these are likely to be reworked.
- 6.6 These Head deposits could preserve significant archaeological evidence. Lower/Middle Palaeolithic and Upper Palaeolithic archaeology, including material associated with buried landsurfaces, is known from Head sequences in this zone and the wider area (MoLA 2017, Wenban-Smith and Bates 2020).

Holocene

- 6.7 The colluvial clays identified in WS01315 may be Holocene and could bury archaeological features and contain reworked artefacts. The palaeoenvironmental potential of the colluvial deposits in WS01315 was low.

PQ Zone 4, Shorne Woods Plateau

- 6.8 One Phase 2 GI intervention, located on the high ground, recorded silty, slightly gravelly sands and clays >0.80 m thick. These are colluvial sediments and had low palaeoenvironmental potential; however, their wider depositional context and archaeological potential is unknown.
- 6.9 Head deposits mapped by the BGS within dry valleys in this zone may include Pleistocene colluvial and solifluction deposits, whilst solution features on the high ground have the potential to preserve Pleistocene deposits. The specific archaeological and geoarchaeological of Pleistocene deposits in this zone is poorly understood; Lower and Middle Palaeolithic archaeological findspots are recorded in this zone (Wenban-Smith and Bates 2020). Holocene colluvial deposits with dry valleys could bury archaeological features and contain reworked artefacts.

PQ Zone 5, Jeskyns shelf

- 6.10 No Phase 2 or Phase 3 GI interventions were carried out in this zone. The archaeological and geoaerchaeological potential of Quaternary deposits in this zone is currently poorly understood. Head deposits mapped within dry valleys may include Holocene colluvium and/or Pleistocene colluvial and solifluction deposits, whilst solution features on the high ground have the potential to preserve Pleistocene deposits.

PQ Zone 6, Thong Lane

Pleistocene

- 6.11 There is extensive GI coverage for this zone, which recorded Head sequences sometimes more than 4.00 m deep. Deeper Head sequences were generally within or adjacent to areas where Head is mapped by the BGS; this is primarily located within dry valleys (Figure 9). Significant unmapped, deep Head sequences were recorded in GI interventions located in the southern part of this zone, however.
- 6.12 The Head generally comprised sandy silts and clays, with material colluvially reworked and/or soliflucted from Palaeogene deposits (principally deriving from the Thanet Formation). The deeper sequences became gravellier towards the base, which may be indicative of episodic water flow. The deeper Head sequences exhibited stratigraphy, which is suggestive of several phases of deposition. This highlights the potential for these Head sequences to contain units belonging to multiple periods of the Pleistocene and Holocene.
- 6.13 The palaeoenvironmental potential of the Head deposits was generally low; however, the upper units in some instances preserved Holocene molluscs (HE540039-PCI-VGT-GEN-REP-GEO-00027).
- 6.14 Head sequences in this zone have significant Palaeolithic archaeological potential; broadly equivalent deposits in adjacent areas are known to preserve stabilization horizons associated with minimally disturbed Lower/Middle and Upper Palaeolithic archaeology (MoLA 2017; Wenban-Smith and Bates 2020).

Holocene

- 6.15 Head sequences in this zone include Holocene colluvium, which can preserve molluscs. These colluvial deposits have the potential to bury archaeological features and contain reworked archaeology.

PQ Zone 7, Filborough

Pleistocene

- 6.16 The BGS maps two Pleistocene Thames terraces in this zone – Lynch Hill/Corbets Tey (Corbets Tey Gravel) and Taplow/Mucking (Mucking Gravel). GI data coverage in this zone is limited and is focussed in areas away from where these terrace deposits are mapped (Figure 10). No unequivocal fluvial deposits associated with these terraces were identified in the GI; additional work is therefore required to establish the lateral and horizontal extent, and depositional processes associated with of these terraces.
- 6.17 Head sequences, up to 7.55 m thick, were recorded on slopes along the margins of Shorne Marshes in this zone. These comprised sandy gravelly clays deposited through colluvial and/or solifluction process. The deep Head sequences likely include multiple phases of deposition and have significant Palaeolithic archaeological potential. These Head deposits abut chalk bedrock; such locations in the Lower Thames region have been shown to be primary locations for human activity focussed on flint raw material procurement and the initial stages of artefact manufacture (Scott 2011). Palaeolithic archaeology in these deposits may be reworked through slope processes or, if buried stable surfaces are preserved, be minimally disturbed.
- 6.18 Greenish grey, sometimes laminated, sandy silty clays were identified in three interventions located at the northern edge of this zone (BH04004, BH04005 and BH04009). These silty clays may be the southern-most extent of Pleistocene fine grained, potentially estuarine, sediments recorded in the PQ Zone 8 (see below).

Holocene

- 6.19 Sediments relating to the Holocene alluvial sequence present across PQ Zone 8, 9 and 10 were recorded in one intervention in this zone (TP04003), this is discussed below. The upper units of the Head sequences in this zone may include Holocene colluvium which could bury archaeological feature and contain reworked artefacts.

PQ Zone 8, Thames, southern floodplain edge

Pleistocene

- 6.20 Unmapped silts and clays, underlain and overlain by Head sequences, were recorded in this zone. This stratigraphic position demonstrates that these are Pleistocene. These silts and clays, which range up to 9.00 m in thickness, were fine grained and frequently laminated; they overlay higher energy fluvial sands and gravels, and an earlier sequence of Head deposits (Figure 11). These well stratified, fine grained, frequently laminated silts and clays are likely estuarine deposits.
- 6.21 Previous published models for the terraces of the Lower Thames (Bridgland 1994a; 2006, Gibbard 1994) do not adequately account for the presence of such Pleistocene estuarine sediments. However, previous work in Lower Medway has identified similar sequences (Bates et al. 2017).
- 6.22 The Preliminary Quaternary Deposit Model (PQDM, Wenban-Smith and Bates 2020) recognised the potential for such deposits to be present beneath the Thames floodplain and proposed a model for such sequences (Table 52). The model suggests that interglacial sediments are likely to rest on older, cold stage, fluvial sediments and that fluvial/estuarine sequences, and to be to be buried by slope wash and solifluction deposits (Head). This model is supported by the GI data.

Table 52 – Brackish water model (Wenban-Smith and Bates 2020)

Phase	Sediments	Depositional environment	Potentially present in GI	Notes
1	Sands and gravels	Cold climate fluvial	Yes	Includes phase of colluvial/solifluction (Head)
2	Sands and silts	Temperate climate fluvial	?No	?Possibly within estuarine sequence
3	Sands and silts	Temperate climate estuarine	Yes	
4	Sands and gravels	Cold climate fluvial	?No	?Truncated and removed by later Head and Holocene sequence
5	Head	Temperate/cold stage colluvial/solifluction	Yes	

- 6.23 The basal, high energy, fluvial sands and gravels and the lower Head sequence recorded in the GI can be correlated with Phase 1 of this model, the laminated low energy and well-stratified estuarine clays and silts with Phase 3 (and possibly Phase 2), and the later Head deposits with Phase 5. No deposits equivalent to Phase 4 of the model were identified; these may have been truncated and removed by the final phase (Phase 5) of Head deposition, or during the Holocene.
- 6.24 The age of this sequence is current unknown, although the basal elevation (between -8.00 and -18.00 m OD) and stratigraphic position within the wider Lower Thames sequence (Figure 14) may indicate that the fluvial gravels and lower Head deposits date to MIS 6 or earlier, the estuarine phase to the last interglacial (MIS 5e) and that the later Head sequence post-MIS 5e. Broad correlation with the East Tilbury Marshes terrace is therefore likely (late MIS 6 and early MIS 2; 160–25 Ka). Providing a definitive chronology for these deposits is key to more firmly establishing their archaeological and geoarchaeological potential and significance.
- 6.25 The Head and estuarine deposits have high palaeoenvironmental potential. The archaeological potential of these Head and estuarine deposits is currently unknown. Should they include deposits dating to MIS 6

and MIS 5 (191–70 Ka) any archaeology they may contain would be highly significant as it has been suggested human populations in Britain were scarce or absent altogether during this period (Ashton and Lewis 2002). As these deposits have not been recognised in previous frameworks for the Lower Thames, this postulated absence may in fact reflect a lack of research into deposits with potential to contain archaeological evidence. The position of these deposits on the edge of floodplain, adjacent to rising chalk bedrock, suggests this location may be a primary location for human activity associated with flint raw material outcrops on the margins of a potentially ecological rich zone.

Holocene

- 6.26 Holocene alluvial sequences, including peat deposits clustered at an elevation of -5.50 m OD, were recorded across this zone. Their stratigraphic position in relation to the wider Lower Thames alluvial sequence (Figure 14) suggests these are likely to be mid Holocene deposits; previous investigations in the main Lower Thames Valley suggest alluvial sequence rarely date later than the Iron Age (800–100 BC) (Sidell et al. 2002, Bates and Stafford 2013).
- 6.27 These alluvial sequences have significant archaeological potential, including for waterlogged organic remains. Palaeoenvironmental remains are preserved in the minerogenic alluvium, but these will invariably be fluvially transported from within the catchment and therefore representative of a potentially large and uncertain source area. Peat deposits are geoarchaeologically significant as a source of information on past vegetation, landscape change and land-use.

PQ Zone 9, Thames, main floodplain

Pleistocene

- 6.28 High energy fluvial sands and gravels were present at a consistent basal elevation (approximately -20 m OD), beneath the Holocene alluvial sequences in this zone. These belong to the Shepperton Gravel. The Shepperton Gravel represents the final phase of Pleistocene fluvial deposition of the River Thames in the late Devensian (17–12 Ka; Gibbard 1994).
- 6.29 The archaeological and geoarchaeological potential of these high energy fluvial deposits is low; however, the surface and deposits immediately overlying the Shepperton Gravel are known to contain minimally disturbed Late to Final Upper Palaeolithic archaeology (Bates and Stafford 2013).

Holocene

- 6.30 Extensive Holocene alluvial sequences (up to 19 m thick) overlay the Shepperton Gravel in this zone. These alluvial sequences extended to a depth of approximately -20.00 m OD (Figure 14). The stratigraphic position of these sequences within the Tilbury alluvial sequence suggest that they range in age throughout the Holocene.
- 6.31 Alluvium dominates the Holocene sequence, comprising bluish grey through to grey silty clays, frequently containing variable quantities of organic inclusions (typically pockets of eroded and redeposited peat) and rootlets, primarily representing in-situ plants growing on and rooted through salt marsh.
- 6.32 Peats were well represented in the GI data and generally occurred at two broad basal elevations; -5.50 and -11.50 m OD. The upper peats may be broadly equivalent with the well-developed peat identified at a similar basal elevation in PQ Zone 8 (see above) and are likely to be later Holocene in date. A relative thin peat was also recorded directly overlying, or close, to the contact with Pleistocene fluvial sands and gravels in three interventions (OH06006, OH06008 and BH07036); this is likely to date to the early Holocene.
- 6.33 As across the Thames floodplain, the alluvial sequences have high archaeological potential, whilst the peats have significant paleoenvironmental potential. As peats were recorded sporadically throughout the depth of the alluvial sequence in this zone, including at the contact with the Shepperton Gravel, peats in this zone have the potential to record changes in environment and landscape change through from the early to mid Holocene (Sidell et al. 2002, Bates and Stafford 2013).

PQ Zone 10, Thames, northern floodplain edge

Pleistocene

- 6.34 GI data indicates that three groups of Pleistocene fluvial deposits are present in this zone (Figure 16). In the south, high energy fluvial sands and gravels with a basal elevation of approximate -20.00 m OD were recorded; these are the lateral continuation of Shepperton Gravel, present across PQ Zone 9 (see above).
- 6.35 To the north fluvial sands and gravels with a basal elevation of approximately -16 to -18 m OD were overlain by finer grained silts and clays, some units of which were laminated. Although – due to more limited data coverage – these are not as well spatially or stratigraphically define, these finer grained silts and clays are comparable to similar deposits identified on the southern back of the Thames floodplain in PQ Zone 8 (see above). These silts and clays, along with the underlying fluvial sand and gravels, reflect a transition from high energy fluvial deposition, potentially under cold conditions, to likely interglacial finer grained fluvial and/or estuarine sediments (Phase 1 to 3 of the brackish water model; see Table 52). The finer grained silts and clays have high palaeoenvironment potential.
- 6.36 The age of the fluvial sands and gravels, and the overlying silts and clays, is currently poorly constrained. However, their position within the wider Thames stratigraphy (Figure 14) suggests that they post-date the Mucking Gravel (MIS 8-7-6; 300–123 Ka) and pre-date the Shepperton Gravel (17–12 Ka); broad correlation with the East Tilbury Marshes terrace is therefore likely (late MIS 6 and early MIS 2; 160–25 Ka).
- 6.37 As with similar deposits in PQ Zone 8, these deposits may have significant Palaeolithic archaeological potential. Notably at least two handaxes have been recovered from Tilbury Docks which are typological characteristic of material dated to MIS 3 (59–41 Ka) and associated with late Middle Palaeolithic Neanderthal activity (White and Jacobi 2002). One handaxe is a slightly rolled, and thus likely to have been reworked from its original context. A second is in fresh condition and may reflect minimally disturbed activity associated with a buried land surface (Wymer 1985). The original context of these artefacts is unknown; however, deposits of this age may be present in PQ Zone 10.
- 6.38 A third, higher set of Pleistocene sands and gravels were present at the northern margin of this zone (basal elevation of -4.00 m). These are the edge of the Mucking Gravel present in PQ Zone 12a; these are discussed below,

Holocene

- 6.39 Holocene alluvial clays overlay the Shepperton Gravel across the southern part the zone, and earlier Pleistocene silts and clays in the north.
- 6.40 Peats with significant paleoenvironmental potential were concentrated within the alluvial sequence in the northern part the zone. These peats had a basal height of approximately -4.50 m OD and are likely to be broadly equivalent with likely mid Holocene peats identified in PQ Zone 8 and 9 (see above). The alluvial deposits in the southern part of the zone likely date from the early Holocene onwards, whilst those in north likely only include later Holocene deposits; these alluvial sediments have significant archaeological potential.

PQ Zone 11, Goshems Farm

- 6.41 No Phase 2 or Phase 3 GI interventions were carried out in this zone. Deposits equated to the Lynch Hill/Corbets Tey terrace and undifferentiated terrace deposits are recorded in this zone by the BGS.
- 6.42 The Corbets Tey Gravel has been investigated at Barvills Farm Pit, which lies at the centre of the zone. Here fluvial sands and gravels overlying Thanet Formation bedrock have been recorded (Bridgland 1983). No archaeological and geoarchaeological evidence is known from these specific deposits, however units of the Lynch Hill/Corbets Tey terrace within the wider area have produced significant Lower Palaeolithic (Globe Pit, sites in Purfleet area) and early Middle Palaeolithic (Botany Pit, Purfleet) archaeological assemblages as well as fossiliferous sands and silts containing significant palaeoenvironmental datasets.
- 6.43 Deposit modelling carried out as part of the PQDM suggests that fluvial sands and gravels of the Mucking Gravel are present in this zone (Wenban-Smith and Bates 2020). The archaeological and geoarchaeological potential of these deposits is currently poorly defined.

PQ Zone 12a, Shearwater Avenue

Pleistocene

- 6.44 The BGS records a single Pleistocene terrace in this zone, which is equated to the Taplow/Mucking terrace. However, GI data has demonstrated that two groups of Pleistocene fluvial deposits are present in this zone (Figure 16); one in the south with a basal elevation of approximately -4.00 m OD and one in the north with a basal elevation of approximately 4 m OD. Based on the regional Lower Thames terrace stratigraphy (Gibbard 1994, 2006), the lower unit may be the Mucking Gravel of the upper Taplow/Mucking terrace (MIS 8-7-6; 300–123 Ka), whilst the upper may be the Corbets Tey Gravel of the Lynch Hill/Corbets Tey terrace (MIS 10-9-8; 364–244 Ka).
- 6.45 However, these basal heights do not readily lend themselves to direct correlation with these deposits (see basal heights for Corbets Tey and Mucking Gravel in long profiles in Gibbard 1994). Consequently, it is possible that there is greater complexity to these fluvial deposits, possibly reflecting multiple terraces within a single glacial-interglacial cycle.
- 6.46 Both sets of deposits comprise fluvial sands and gravels reflecting generally high energy deposition; no deposits with significant palaeoenvironmental potential were identified in the GI monitoring. Palaeolithic artefacts are recorded from these sands and gravels in this zone (Wenban-Smith and Bates 2020).
- 6.47 Head sequences more than 3.00 m thick were present in GI interventions located in two major south-north oriented valleys which run through this zone (Figure 16). These Head deposits document multiple phases of colluvial deposition. The colluvial sequences recorded in the GI have generally low palaeoenvironmental potential but they could potentially preserve landsurfaces associated with minimally disturbed Palaeolithic archaeology, as well as artefacts reworked from the adjacent terrace deposits.

Holocene

- 6.48 Head sequences within the two south-north oriented valleys in this zone may include Holocene colluvium, which could bury archaeological features, as well as contain reworked artefacts.

PQ Zone 12b, Sutton's Farm

- 6.49 Quaternary deposits mapped in PQ Zone 12b belong to the Mucking Gravel. No Phase 2 or Phase 3 GI interventions were carried out in this zone. The archaeological and palaeoenvironmental potential of these deposits is currently poorly defined.

PQ Zone 13, Chadwell Saint Mary

Pleistocene

- 6.50 Pleistocene deposits with a consistent basal height of approximately 20.00 m OD have been identified in this zone. These belong to the Orsett Heath Gravel (Gibbard 1994). The deposits primarily consisted of sands and gravel, and gravelly sands, generally reflecting moderate to high energy deposition. The paleoenvironmental potential of Pleistocene sediments in the GI was generally low, however, a silty clay recorded in the fluvial sequence in one intervention (BH14302) may have greater potential.
- 6.51 The Orsett Heath Gravel is part of the Boyn Hill/Orsett Heath terrace, which is thought to have aggraded between late MIS 12 and MIS 10 (450–337 Ka). The Lower Palaeolithic archaeological potential of these deposits is illustrated by previous historic finds, principally of handaxes, from the western part of the zone; there are a significant number of findspots from areas associated with quarrying activity and housing development within and around Orsett Heath and Chadwell St Mary. Some artefacts are provenanced to specific localities while others are recorded to broad areas. In the case of the latter, it is notable that Pigg's Pit, Chadwell St Mary is in this zone; this has been suggested to be the source of many of the over 100 handaxes recorded from the general Chadwell St Mary area (Wymer 1999). The specific contextual associations of much of this material is currently poorly understood. It will include material that has been fluvially reworked but may also contain minimally disturbed archaeology.

Holocene

- 6.52 No significant Holocene deposits were identified in this zone. Head deposits mantle the western margin of the valley locate along the eastern edge of this zone and in PQ Zone 15 (see below); this may include Holocene colluvial deposits that could bury archaeological features and contain reworked artefacts.

PQ Zone 14, Southfields

Pleistocene

- 6.53 The small number of GI interventions in this zone primarily encountered Head deposits associated with a major valley running through the zone. These deposits are discussed below.
- 6.54 One GI intervention (BH12310) identified possible fluvial deposits comprising gravelly sandy clays and gravelly sands. The limited lithological data indicates these may be fluvial deposits, although they could be colluvially/soliflucted sediments. In the same area Gibbard (1994) records a 4.00 m fluvial sequence comprising cross-bedded sands overlain by cross bedded gravels and interbedded sands.
- 6.55 These sediments are mapped by Bridgland (1994b) as an extension of the Orsett Heath Gravel found in PQ Zone 13, whilst Gibbard (1994) ascribes them to a separate fluvial body, the Black Park Gravel. The GI data demonstrates that these deposits belong to a stratigraphically distinct unit from the Orsett Heath Gravel in PQ Zone 13 (Figure 22), with a higher basal height of approximately 30.00 m OD.
- 6.56 Based on their higher elevation, the fluvial sediments in PQ Zone 14 likely predate the Orsett Heath Gravel in PQ Zone 13. This suggests that the Black Park Gravel in PQ Zone 14 aggraded during the immediate post-Anglian southward diversion of the Thames, with a probable age estimate of late MIS 12 and/or early MIS 11 (450–400 Ka).
- 6.57 The deposits present in BH12310 had low palaeoenvironmental potential. The Palaeolithic archaeological potential of the Black Park Gravel in this zone is currently unknown.

Holocene

- 6.58 Head deposits in intervention along the western boundary between PQ Zones 14 and 15 may include Holocene colluvium (see below).

PQ Zone 15, Brook Farm Channel

Pleistocene

- 6.59 This zone is dominated by a south-east to north-west orientated valley which extends between the south-east side of the Mar Dyke valley and the north-west side of the main Thames estuary. GI data has demonstrated that Pleistocene deposits in this zone comprise fluvial sands and gravels which are truncated and overlain by Head sequences.
- 6.60 It has been postulated that this valley may represent a Pleistocene drainage route of the Mar Dyke (Wenban-Smith and Bates 2020); however, no sediments potentially associated with this were identified in GI monitoring. The truncated fluvial sequences consist of sands and gravels and reflect the eastward extension of the Orsett Heath Gravels present in PQ Zone 13 (Figure 22); these have generally low paleoenvironmental potential but could contain Lower Palaeolithic archaeology (see above).
- 6.61 The Head can be extensive, with the deepest sequence recorded being 4.70 m thick. In GI interventions it generally comprised material reworked downslope by colluvial and solifluction processes from earlier Pleistocene fluvial deposits and Palaeogene units. The stratigraphy likely includes multiple phases of deposition post-dating the deposition of the Orsett Gravel, which it truncates.
- 6.62 The Head sequences in GI interventions had generally low palaeoenvironmental potential. These deposits are likely to contain Palaeolithic artefacts reworked from the Orsett Gravel but may also bury stabilisation horizons which preserve contemporary Palaeolithic archaeology.

Holocene

- 6.63 The Head sequences in this zone may include a Holocene component which has the potential to bury archaeological features and contain reworked artefacts belonging to multiple periods.

PQ Zone 16, Loft Hall Farm

- 6.64 Head sequences up to 2.00 m thick were sporadically encountered in GI this zone. These units comprise sediments reworked from Pleistocene fluvial deposits in adjacent zones, along with material from Palaeogene bedrock. The palaeoenvironmental potential of these deposits is low. They may contain Palaeolithic and later archaeology, although this is primarily likely to be reworked.

PQ Zone 17, Cuckoo Lane

- 6.65 No Phase 2 or Phase 3 GI interventions were carried out in this zone. However, deposits in this zone are mapped by the BGS as part of the Lynch Hill/Corbets Tey terrace; such deposits were encountered in GI interventions in PQ Zone 19 (see below) and have high Pleistocene palaeoenvironmental and Palaeolithic archaeological potential.

PQ Zone 18, Mederbridge Road (Ockendon Loop)

- 6.66 As with PQ Zone 17, no Phase 2 or Phase 3 GI interventions were carried out in this zone but deposits of the Lynch Hill/Corbets Tey terrace with significant Pleistocene palaeoenvironmental and Palaeolithic archaeological potential likely to be present; organic units are recorded in historic borehole data (BGS online viewer)

PQ Zone 19, Kemps Farm, Dennis Road and Manor Farm

Pleistocene

- 6.67 Extensive Pleistocene fluvial sequences have been identified in this zone. These comprised low energy silts and clays, which included organic units, located within a channel (Figures 26 –28). The deposits within the channel were overlain by slightly higher energy gravelly sands and fine to medium sandy, clays sands and silty sands, which sometimes exhibit horizontal bedding structures and laminations. The deposits are part of the Lynch Hill/Corbets Tey terrace (MIS 10-9-8; 364–244 Ka),
- 6.68 The channel deposits are interglacial deposits belonging to the Ockendon Channel, which has previously been mapped south of the zone (Gibbard 1994). The GI data enables the northward course of this channel to be mapped, straddling the border of PQ Zone 19 and 25 (Figure 29). The channel likely continues south-south-westwards to join with similar channel fills at Belhus Park, which have produced plant macrofossils, molluscs and vertebrate remains (Schreve 1997). The palaeoenvironmental potential of the channel deposits encountered in this zone is similarly high.
- 6.69 The Palaeolithic archaeological potential of the channel deposits and overlying sediments is also high as broadly equivalent deposits in the area have produced minimally disturbed archaeology. At Belhus Park the deposits overlying the channel fills have produced Lower Palaeolithic artefacts, some in very fresh condition indicating minimal post-depositional reworking (Wymer 1985).

Holocene

- 6.70 No significant Holocene deposits were identified in this zone.

PQ Zone 20a, Green Lane, east side of Mar Dyke basin

Pleistocene

- 6.71 Shallow Head sequences (less than 1.00m thick) comprising colluvial and/or soliflucted sediments were encountered in this zone. These have low Pleistocene paleoenvironmental and Palaeolithic archaeological potential; they may be principally Holocene.

Holocene

- 6.72 The Head sequences in this zone may include Holocene colluvium, which could bury archaeological features and contain reworked artefacts of multiple periods.
- 6.73 One intervention in the northern part of the zone (BH15301), located on the edge of the floodplain of the Mar Dyke, recorded 0.90 m of minerogenic alluvium; these deposits have low palaeoenvironmental and limited archaeological potential.

PQ Zone 20b, Castle's Grove, east side of Mar Dyke basin

- 6.74 Shallow Head sequences analogues with those in PQ Zone 20a were recorded in interventions in this zone (see above).

PQ Zone 20c, Bulphan, east side of Mar Dyke basin

- 6.75 No Gi interventions were carried out in this zone. Head sequences akin those in in PQ zones 20a and 20b are likely to be present.

PQ Zone 21, Mar Dyke narrows

- 6.76 No Gi interventions were carried out in this zone. Based on the BGS mapping, Head and alluvial sequences may be present.

PQ Zone 22a, Mar Dyke Basin, main (Fen Farm)

Pleistocene

- 6.77 Head sequences generally less than 1.00m thick were recorded in this zone. These may include Pleistocene units but have low paleoenvironmental and limited Palaeolithic archaeological potential. Based on the GI data, no extensive Pleistocene Head sequences are identifiable in the Mar Dyke basin.

Holocene

- 6.78 Holocene alluvial sequences of the Mar Dyke were identified in this zone. These are less widespread than mapped by the BGS, seeming restricted to a narrow floodplain (Figure 33). The alluvial sequences tended to be 1.00-2.00 m thick but extended up to 4.00 m. Only minerogenic deposits were encountered; no peats were present.
- 6.79 The alluvial sequences recorded in the GI have low palaeoenvironmental potential, they may, however, have archaeological potential.

PQ Zone 22b Mar Dyke Basin, northwest (Puddle Dock)

- 6.80 The principally Quaternary deposits identified in this zone were colluvial/solifluction deposits, which included Holocene colluvium, forming shallow Head sequences (<1.00 m thick). These have low palaeoenvironmental and limited archaeological potential.

PQ Zone 23a, Mar Dyke, eastern margin (Orsett Fen, Hobletts)

- 6.81 As across the Mar Dyke, only shallow Head sequences with low palaeoenvironmental and limited archaeological potential were identified in this zone.
- 6.82 The principal Quaternary deposits recorded consist of alluvial sequences of the Mar Dyke. These alluvial sequences are widespread in the western part of this zone. These sequences were up to 4.74 m in thickness and included peats.
- 6.83 Peats within the alluvial sediments ranged from 0.20 to 0.40 m in thickness. Although relatively thin, these peats are geoarchaeologically significant as a source of information on past vegetation, landscape change and land-use. Isolated peat deposits preserved within minor river valleys in the areas have tended to be overlooked in favour of more expansive beds, for example such as those preserved within the Thames floodplain (Devoy 1979). However, minor river valleys contain important palaeoenvironmental archives and evidence of the dynamic nature of past riverine wetland environments.
- 6.84 Within the main Lower Thames estuarine contexts, peats tend to exclusively date to the early to mid Holocene (Sidell et al. 2002, Bates and Stafford 2013). However later peats are preserved in tributary valleys, such as the Ebbsfleet (Bates and Stafford 2013). The age of peats in the Mar Dyke are unknown; they may have significant potential for understanding later Holocene environmental conditions and landscape-use. The alluvial sequences in this zone may also have archaeological potential.

PQ Zone 23b, Mar Dyke, eastern margin (Stringcock Fen)

- 6.85 No Gi interventions were carried out in this zone. Based on the BGS mapping, Head sequences may be present which are similar to those in other zones across the Mar Dyke.

PQ Zone 24, West side of Mar Dyke basin, east of South Ockendon Hall

- 6.86 The limited number of GI interventions in this zone sporadically identified shallow Head sequences (<1.00 m thick) contain colluvial and soliflucted material. Where encountered, these deposits had low palaeoenvironmental and limited archaeological potential.

PQ Zone 25, Hall Farm

Pleistocene

- 6.87 Two stratigraphically distinct Pleistocene terrace deposits have been identified in this zone (Figures 26–28). In the west the continuation of the Ockendon Channel and Orsett Gravel has been identified. These are analogous with deposits identified in PQ Zone 19 and have similarly high palaeoenvironmental and Palaeolithic archaeological potential.
- 6.88 Further east, fluvial sands and gravel with a basal elevation 20.00 m OD are present. These are the north-ward continuation of the Orsett Gravel in PQ Zone 13. These comprised generally high energy fluvial sands and gravels; where observed these had low palaeoenvironmental potential. Although less archaeological material is known from these outcrops than their equivalents in PQ Zone 13, they may nevertheless have similarly high Lower Palaeolithic archaeological potential.
- 6.89 Head sequences more than 2.00m thick were identified within a dry valley which has incised through the fluvial deposits in the southern part of this zone. These Head deposits comprised material reworked downslope from these Pleistocene fluvial deposits and underlying Palaeogene sediments by colluvial and solifluction processes. These Head sequences have potential to contain Palaeolithic archaeology reworked from the terrace sequences but may also contain buried landsurfaces that could preserve contemporary Palaeolithic material.

Holocene

- 6.90 The Head sequence identified in the south of the zone could include Holocene colluvium which could bury archaeological features contain reworked artefacts.

PQ Zone 26, White Post Farm

- 6.91 Pleistocene deposits recorded by Gibbard (1994) as Black Park Gravel are present in this zone. These may represent a distinct, earlier suite of fluvial deposits from the Orsett Heath Gravel recorded to the west in PQ 25; they may be contemporary with the possible Black Park Gravel identified in PQ Zone 14. No Phase 2 or Phase 3 GI interventions were carried out in this zone.

PQ Zone 27, Mar Dyke, northern edge

- 6.92 Head deposits comprising sandy gravelly clays, generally less than 1.00m but sometimes ranging up to 3.00m thick, were recorded in some GI interventions in this zone. These are colluvial and/or soliflucted. They have low palaeoenvironmental potential, and their archaeological potential is limited.

PQ Zone 28, Foxburrow Wood

- 6.93 Three GI interventions were carried out in this zone, none encountered Quaternary deposits.
- 6.94 No deposits of the Stanmore Gravel Formation (Pliocene of Early Pleistocene Thames deposits), which could potentially be present in this zone, were identified in the GI.

PQ Zone 29, Park Pale

- 6.95 GI intervention in this zone identified Head sequences within a south-west to north-east orientated dry valley which runs through this zone. The sequences encountered were shallow (<1.00 m), comprising colluvial sandy clays, which may be Pleistocene and/or Holocene in date. These deposits have generally low paleoenvironmental potential. Given the shallow depths, the archaeological potential of these deposits in areas sampled is also limited; however, deeper sequences with the potential to bury stable Pleistocene land surfaces and/or Holocene archaeological features may be present elsewhere.

7. Recommendations

Introduction

- 7.1 Pleistocene and Holocene deposits were identified and sampled during Phase 2 and 3 GI monitoring which have significant potential to preserve palaeoenvironmental remains, including molluscs, plant macro-fossil and microfossils (including pollen, ostracods, diatoms and foraminifera). These datasets have the potential to inform on changing physical and environmental conditions, providing an important environmental context for past human settlement of the landscape, including evidence for past land-use. The datasets may also aid in constructing chronological frameworks for key deposit sequences. Assessment of selected samples is therefore recommended.
- 7.2 Suitable samples for assessment are listed and assessment methods outlined. Additionally, a suggested discard policy for bulk samples with low assessment potential is provided.

Palaeoenvironment assessment

- 7.3 The principal aim of assessment is to determine the preservation potential of key palaeoenvironmental remains and, where possible, the age of deposits. The results will inform the need for and scope of subsequent analysis and help to target and refine further specific geoarchaeological field investigations.
- 7.4 Assessment focused on key deposits with the highest geoarchaeological potential to preserve palaeoenvironmental remains and samples which have the highest stratigraphic integrity is recommended. Selected samples which fulfil these criteria are outlined in Table 54.

Table 53 – Selected samples suitable for palaeoenvironmental assessment

GI Intervention	GI Phase	PQ Zone	Sample number/ core length	Sample Type	Sample size (litres)	Lithology	Stratigraphy
BH04005	2	7	9400501	Bulk	5	Sandy silty clay	Pleistocene silts and clays
BH04307	3	8	90430701	Bulk	5	Laminated sands	Pleistocene silts and clays
BH04307	3	8	90430702	Bulk	2	Sandy clay	Pleistocene silts and clays
BH04307	3	8	90430703	Bulk	5	Sandy clay	Pleistocene silts and clays
BH04312	3	8	90431203	Bulk	0.5	Sandy clay	Pleistocene silts and clays
BH04312	3	8	90431204	Bulk	0.5	Silty clay	Pleistocene silts and clays
BH04312	3	8	90431205	Bulk	10	Silty clay	Pleistocene silts and clays
BH04312	3	8	90431206	Bulk	10	Peat	Holocene alluvium
BH04312	3	8	90431207	Bulk	1	Laminated sandy clay	Pleistocene silts and clays
BH04312	3	8	90431208	Bulk	1	Laminated silty clay	Pleistocene silts and clays
BH04312	3	8	90431209	Bulk	5	Laminated silty clay	Pleistocene silts and clays
BH04312	3	8	90431210	Bulk	5	Shelly silt	Pleistocene silts and clays
BH04315	3	8	90441501	Bulk	2	Shelly silt	Pleistocene silts and clays
BH04315	3	8	90441502	Bulk	8	Laminated grey clay and black sand	Pleistocene silts and clays

BH04315	3	8	90441503	Bulk	3	Laminated grey clay and black sand	Pleistocene silts and clays
BH04315	3	8	90441504	Bulk	7	Laminated sands and clays	Pleistocene silts and clays
BH04315	3	8	90441505	Bulk	0.5	Laminated silty clay	Pleistocene silts and clays
BH04315	3	8	90441506	Bulk	0.5	Silty clay	Pleistocene silts and clays
BH04315	3	8	90441507	Bulk	0.5	Silty clay	Pleistocene silts and clays
BH04315	3	8	90441508	Bulk	0.5	Silty clay	Pleistocene silts and clays
BH04315	3	8	90441509	Bulk	0.5	Silty clay	Pleistocene silts and clays
BH04316	3	8	90441602	Bulk	10	Laminated sandy clay	Pleistocene silts and clays
BH04316	3	8	90441603	Bulk	5	Laminated sandy clay	Pleistocene silts and clays
BH04316	3	8	90441604	Bulk	2	Laminated sandy clay	Pleistocene silts and clays
BH04313	3	8	1.50-3.00	Core	-	Peat	Holocene alluvium
BH04313	3	8	6.00-9.70	Core	-	-	Head
BH04315	3	8	6.50-15.00	Core	-	-	Head
					-	-	Pleistocene silts and clays
BH04320	3	8	6.00-9.00	Core	-	-	Holocene alluvium
BH04320	3	8	13.00-17.50	Core	-	-	Pleistocene silts and clays
BH04321	3	8	8.00-15.00	Core	-	-	Head
BH04322	3	8	1.50-9.00	Core	-	Peat	Holocene alluvium
BH04326	3	9	9042601	Bulk	0.5	Peat	Holocene alluvium
BH04327	3	9	9042701	Bulk	0.5	Peat	Holocene alluvium
BH04327	3	9	9042703	Bulk	10	Peat	Holocene alluvium
BH04331	3	9	90433101	Bulk	2	Peat	Holocene alluvium
BH08022	2	10	6	Bulk	8	Peat	Holocene alluvium
BH08022	2	10	7	Bulk	8	Peat	Holocene alluvium
BH08022	2	10	8	Bulk	8	Peat	Holocene alluvium
BH14302	3	13	9143021	Bulk	1	Silty clay	Orsett Heath Gravel
BH16316	3	19	91631602	Bulk	5	Organic clay sand	Ockendon Channel
BH21302	3	19	92130207	Bulk	1	Organic silty clay	Ockendon Channel
BH21302	3	19	92130208	Bulk	4	Organic silty clay	Ockendon Channel

BH21302	3	19	92130209	Bulk	10	Organic silty clay	Ockendon Channel
BH21303	3	19	92130301	Bulk	8	Organic sandy clay	Ockendon Channel
BH21309	3	19	9213091	Bulk	18	Organic silty clay	Ockendon Channel
BH21307	3	19	7.00-14.50	Core	-	-	Ockendon Channel
BH21313	3	19	10.50-17.00	Core	-	-	Ockendon Channel
BH21325	3	19	7.00-14.00	Core	-	-	Ockendon Channel
WS16005	2	23a	8160051	Bulk	2	Peat	Holocene alluvium
WS16009	2	23a	8160091	Bulk	2	Peat	Holocene alluvium
WS16009	2	23a	8160091	Bulk	2	Peat	Holocene alluvium
BH21300	3	25	92130001	Bulk	2	Sandy clay	Corbets Tey Gravel
BH21300	3	25	92130002	Bulk	2	Clay sand	Corbets Tey Gravel
BH21304	3	25	92130401	Bulk	2	Sandy clay	Corbets Tey Gravel
BH20311	3	25	92031104	Bulk	1	Clay sand	Corbets Tey Gravel
BH20311	3	25	92031105	Bulk	10	Clay sand	Corbets Tey Gravel
BH21324	3	25	92132402	Bulk	2	Clay sand	Corbets Tey Gravel
BH21324	3	25	92132403	Bulk	2	Clay sand	Corbets Tey Gravel
BH21378	3	25	92137802	Bulk	6	Sandy clay	Corbets Tey Gravel
BH21378	3	25	92137803	Bulk	10	Sandy clay	Corbets Tey Gravel
BH21378	3	25	92137804	Bulk	8	Sandy clay	Corbets Tey Gravel
BH21378	3	25	92137805	Bulk	1	Sandy clay	Corbets Tey Gravel
BH21378	3	25	92137806	Bulk	6	Sand and clay	Corbets Tey Gravel
BH21305	3	25	12.00-14.50	Core	-	-	Ockendon Channel
BH21308	3	25	11.50-16.50	Core	-	-	Ockendon Channel
BH21310	3	25	12.50-18.50	Core	-	-	Ockendon Channel
BH21311	3	25	13.00-16.50	Core	-	-	Ockendon Channel
BH21314	3	25	11.00-18.00	Core	-	-	Ockendon Channel
BH21316	3	25	7.00-14.00	Core	-	-	Ockendon Channel
BH21318	3	25	11.50-16.00	Core	-	-	Ockendon Channel

Methods

Scientific dating

Radiocarbon dating

- 7.5 Short-lived terrestrial plant macrofossils may be preserved in late Pleistocene and Holocene organic deposits. These are considered the most reliable material for radiocarbon dating. Care should be taken to select suitable material for radiocarbon dating. Any potential issues of contamination by young or old carbon should be identified. Situations may arise where suitable short-lived material is not available, and recommendations should be made for these circumstances to ensure confidence in the dating of deposits.
- 7.6 In some instances, organo-mineral deposits may be identified which do not preserve suitable short-lived plant remains. In this event bulk samples for AMS dating may be the only viable solution, in which case it is recommended that two samples are sent for dating and that the humin and humic fraction is measured for each sample. This will help to ensure that there are no issues of contamination with old carbon or inversion of dates.
- 7.7 Similar dating of the humin/humic fraction should be employed for samples from organic-rich samples where suitable short-lived material is absent.

Luminescence

- 7.8 Luminescence dating is an established technique for determining the depositional age of sediments that are too old to be dated using radiocarbon dating, or sediments that are minerogenic and lack organic material. Luminescence dating can also be used alongside other techniques as part of a comparative dating strategy. Luminescence dating can be applied to a wide range of depositional environments including alluvial, fluvial, glacial, coastal and shallow marine. The age range of luminescence dating extends from decades to >300,000 years. Optical stimulated luminescence (OSL) dating of quartz is the most conventional technique for dating Pleistocene deposits but advances in Infra-red stimulated luminescence (IRSL) dating of feldspar are allowing much older deposits to be reliably dated, or providing an independent chronological control for OSL.
- 7.9 No samples suitable for luminescence dating were recovered during GI monitoring. However, this technique is applicable for dating key Pleistocene deposits delimited during monitoring. Future geoarchaeological investigations should include targeted sampling in order to establish a robust chronological framework for these deposits.

Palaeoenvironmental assessment techniques

- 7.10 Palaeoenvironmental assessment involves a suite of complimentary techniques in accordance with Historic England guidelines on good practice in environmental archaeology and geoarchaeology (English Heritage 2011, Historic England 2015b), providing a comprehensive understanding of the depositional and environmental context of the sediments.
- 7.11 Deposits of high geoarchaeological value include peat and other organic rich sediment that have the potential to preserve a range of palaeoenvironmental remains, and fine-grained calcareous Pleistocene sediments

Ostracoda, diatoms and foraminifera

- 7.12 Diatoms (unicellular algae), foraminifera (marine protozoa) and ostracods (bivalve Crustacea) occur in a wide range of marine and semi-terrestrial environments (e.g. saltmarsh) and provide important comparative indicators on past coastal and riverine change. Assessment of sediments at transitions can help to distinguish evidence for sea-level, coastal and riverine change, including, the influence of storm/high tide events on semi-terrestrial environments (perhaps visible as fine organic/mineral banding in sediments). Some instances species can also have chronological significance

Molluscs

- 7.13 Molluscs can be preserved in calcareous sediments and provide a record of local environmental conditions. In some instances, species can also provide chronological indicator for the age of Pleistocene sediments.

Pollen

7.14 Pollen is one of the principal techniques used in environmental archaeology to investigate past vegetation environments and the impact of human communities on the landscape, the latter often evident as distinct phases of woodland clearance or specific land-use strategies (e.g., cereal cultivation, creation of pastures or meadows). Pollen is best preserved in waterlogged organic and oxygen-free sediment, such as peat, where the pollen grains are most representative of the surrounding vegetation at the time of deposition. Marine/riverine sediments are not ideal for pollen assessment as the grains may be transported over long distances or suspended in the water column for significant periods of time

Insects and plant macrofossils

7.15 Humic acid clays, silts and peaty deposits have the potential to preserve insect remains and plant macrofossils. These can contribute to assessing climatic and environmental conditions. Plant macrofossils and associated biological remains can provide short-lived material suitable for radio-carbon dating.

Sample discard policy

7.16 The potential all bulk samples taken as part geoarchaeological monitoring for paleoenvironmental assessment has been provided. Samples have been classified as having low, medium and high potential. Samples with low potential have little potential for further work and it is recommended that samples are discarded, as they. Samples recommended for discard are listed in Table 55.

Table 54 – Palaeoenvironmental samples with low potential for assessment and recommended for discard

GI Intervention	GI Phase	PQ Zone	Sample number	Sample Type
BH04012	2	8	9401201	Bulk
BH04015	2	8	9401501	Bulk
BH04015	2	8	9401502	Bulk
BH04309	3	8	90430901	Bulk
BH04309	3	8	90430902	Bulk
BH04311	3	8	90431001	Bulk
BH04311	3	8	90431002	Bulk
BH04312	3	8	90431202	Bulk
BH04316	3	8	90441601	Bulk
BH04317	3	8	90441701	Bulk
BH04323	3	8	90432301	Bulk
BH04323	3	8	90432302	Bulk
BH04323	3	8	90432303	Bulk
BH04323	3	8	90432304	Bulk
BH04324	3	8	90432301	Bulk
BH04324	3	8	90432302	Bulk
BH04324	3	8	90432303	Bulk
BH04324	3	8	90432304	Bulk
BH05001	2	9	9500101	Bulk
BH05001	2	9	9500102	Bulk
BH05001	2	9	9500103	Bulk
BH05001	2	9	9500104	Bulk
BH04326	3	9	9042602	Bulk
BH04326	3	9	9042603	Bulk
BH04326	3	9	9042604	Bulk

BH04326	3	9	9042605	Bulk
BH04327	3	9	9042702	Bulk
BH04330	3	9	90433001	Bulk
BH04330	3	9	90433002	Bulk
BH04330	3	9	90433003	Bulk
BH04330	3	9	90433004	Bulk
BH04331	3	9	90433102	Bulk
BH04327	3	9	9042701	Bulk
BH04327	3	9	9042703	Bulk
BH04331	3	9	90433101	Bulk
BH04333	3	9	90433301	Bulk
BH04333	3	9	90433302	Bulk
BH04333	3	9	90433303	Bulk
BH04333	3	9	90433305	Bulk
BH08014	2	10	4	Bulk
BH08014	2	10	5	Bulk
BH08305	3	10	90830501	Bulk
BH09305	3	12a	9093053	Bulk
BH09307	3	12a	9093074	Bulk
BH09308	3	12a	9093083	Bulk
BH13009	2	13	9130091	Bulk
BH13009	2	13	9130092	Bulk
BH12306	3	13	9123062	Bulk
BH13315	3	13	9133151	Bulk
BH13331	3	13	91333101	Bulk
BH14335	3	13	91433501	Bulk
TP12300	3	13	123003	Bulk
TP12301	3	13	123013	Bulk
TP13308	3	13	133081	Bulk
TP14302	3	13	143021	Bulk
TP14302	3	13	143022	Bulk
BH10312	3	14	9103123	Bulk
TP11300	3	14	113004	Bulk
TP13306	3	15	1339061	Bulk
BH16316	3	19	91631601	Bulk
BH16316	3	19	91631603	Bulk
BH21302	3	19	92130201	Bulk
BH21302	3	19	92130202	Bulk
BH21302	3	19	92130203	Bulk
BH21302	3	19	92130204	Bulk
BH21302	3	19	92130205	Bulk
BH21302	3	19	92130206	Bulk
BH21307	3	19	92130701	Bulk
TP17005	2	22a	170051	Bulk

BH17306	3	22a	91730601	Bulk
BH19300	3	25	91930001	Bulk
BH19300	3	25	91930002	Bulk
BH19300	3	25	91930003	Bulk
BH19300	3	25	91930004	Bulk
BH19304	3	25	91930001	Bulk
BH20302	3	25	92030201	Bulk
BH20302	3	25	92030202	Bulk
BH20302	3	25	92030203	Bulk
BH20311	3	25	92031101	Bulk
BH20311	3	25	92031102	Bulk
BH20311	3	25	92031103	Bulk
BH20315	3	25	92031501	Bulk
BH20315	3	25	92031502	Bulk
BH21324	3	25	92132401	Bulk
BH21324	3	25	92132404	Bulk
BH21378	3	25	92137801	Bulk
BH21378	3	25	92137807	Bulk
TP21300	3	25	2130001	Bulk
TP21300	3	25	2130002	Bulk

8. References

Lower Thames Crossing Documents

HE540039-CJV-GEN-GEN-SPE-GEO-00068 Lower Thames Crossing: A Technical Specification for the Geoarchaeological and Palaeo-environmental Mitigation of Geotechnical Ground Investigation (2019)

HE540039-PCI-GEN-GEN-REP-GEO-00030 Lower Thames Crossing Ground Investigations: Written Scheme of Investigation for Archaeological Monitoring and Geoarchaeological Investigations (2019)

HE540039-PCI-GEN-GEN-REP-GEO-00054 Lower Thames Crossing Ground Investigations: Written Scheme of Investigation for Archaeological Monitoring and Geoarchaeological Investigations Addendum: Geoarchaeological Desk-based Assessment (2019)

HE540039-PCI-VGT-GEN-REP-GEO-00027 Lower Thames Crossing Ground Investigations: Phase 2 Ground Investigation Specification Land Based Works – NGGE (2020)

HE540039-PCI-GEN-GEN-REP-GEO-00109 Lower Thames Crossing Ground Investigations: Phase 2 Ground Investigation Specification Land Based Works – Report on Archaeological Monitoring and Geoarchaeological Investigations: Work Package A (2020)

HE540039-PCI-GEN-GEN-REP-GEO-00110 Lower Thames Crossing Ground Investigations: Phase 2 Ground Investigation Specification Land Based Works – Report on Archaeological Monitoring and Geoarchaeological Investigations: Work Package B (2020)

HE540039-PCI-GEN-GEN-REP-GEO-00111 Lower Thames Crossing Ground Investigations: Phase 2 Ground Investigation Specification Land Based Works – Report on Archaeological Monitoring and Geoarchaeological Investigations: Work Package C (2020)

HE540039-PCI-GEN-GEN-REP-GEO-00112 Lower Thames Crossing Ground Investigations: Phase 2 Ground Investigation Specification Land Based Works – Report on Archaeological Monitoring and Geoarchaeological Investigations: Work Package D (2020)

HE540039-PCI-GEN-GEN-REP-GEO-00101 Lower Thames Crossing Ground Investigations: Ground Investigation Specification Land Based Works – Phase 3 (2020)

HE540039-PCI-GEN-GEN-REP-GEO-00102 Lower Thames Crossing Ground Investigations: Written Scheme of Investigation for Archaeological Monitoring and Geoarchaeological Investigations. Lower Thames Crossing Phase 3 GI (2020)

HE540039-PCI-GEN-GEN-REP-GEO-00105 Lower Thames Crossing Ground Investigations: Report on Archaeological and Geoarchaeological Monitoring of Ground Investigations, Orsett Crop Mark Complex Scheduled Monument (2020)

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Appendix A

Phase 3 Trial pit tables

Trial Pit No 01300		Length 4.00 m	Width 0.60 m	Depth 3.00 m	
Easting 566733.10		Northing 170173.54		m OD 71.75	
Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth BGL	
13001		Topsoil	Dark brownish sandy silty clay with common fine clasts of mixed lithologies. Rare brick. Plastic and wood.	0.00-0.15	
13002		Made ground/modern disturbance	Firm grey slightly sandy silty clay with common yellowish mottles.	0.15-1.70	
13003		Thanet Sand	Grey sandy clayey silt.	1.70-2.70	
13004		Thanet Sand	Grey sandy clayey silt. Very frequent manganese flecks and frequent orange Fe staining.	2.70-2.80	
13005		Chalk	Solid white blocky chalk.	2.80-3.00+	

Trial Pit No 01303		Length 3.50 m	Width 1.00 m	Depth 4.00 m	
Easting 566780.41		Northing 170261.12		m OD 68.64	
Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth BGL	
13031		Topsoil	Dark brown slightly sandy silty clay with very rare flint clasts of varying size and shape. Single piece of burnt flint recovered from spoil and a flake from surface following backfill. Abrupt contact.	0.00-0.30	
13032		Thanet Sand	Greyish slightly clayey sandy silt with common yellow lenses / mottles. Very occasional fine (30mm) sub-angular and sub-rounded flint clasts. Principally Thanet Sand, but the top metre could be Head.	0.30-4.00+	

Trial Pit No 01303A		Length 3.50 m	Width 1.00 m	Depth 4.00 m
Easting 566739.35		Northing 170259.74		m OD 70.30
Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth BGL
13031A		Topsoil	Dark brown sandy silty clay with rare gravels of angular to rounded shape and generally up to 0.05m in size. Considerable amount of burnt flint present on surface/topsoil in vicinity of this test pit. Abrupt contact.	0.00-0.30
13032A		Colluvial silty clay (Head)	Yellowish brown sandy silt with rare angular to rounded flint gravel generally <5mm in size. Single very large (300mm) cobble was observed during enlargement of trial pit. Abrupt contact.	0.30-1.10
13033A		Thanet Sand	Greenish grey sandy clay silt. Abrupt contact.	1.10-2.05
13034A		Thanet Sand	Greyish yellow sandy silt with occasional manganese lumps (<50mm) and some flint nodule, Frequent orange/red Fe staining. Abrupt contact,	2.05-2.30
13335A		Chalk bedrock	Solid, white blocky chalk.	2.30-4.00+

Trial Pit No 10300		Length 3.00 m	Width 0.40 m	Depth 4.00 m
Easting 566585.2558		Northing 178890.3511		m OD 15.8364
Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth BGL
103001		Topsoil	Dark brown clayey silt with occasional sub rounded flint (<=40mm).	0.00-0.25
103002		Subsoil	Mid yellowish brown clayey silt with rare sub rounded flint (<=40mm).	0.25-0.80
103003		Colluvial sand (Head)	Light reddish brown silty sand with occasional yellow patches, with occasional sub rounded flint gravel (<=40mm).	0.80-1.30
103004		Colluvial sand (Head)	Light brownish yellow sand with occasional sub rounded flint gravel (<40mm). Becoming firmer and more strongly yellow coloured with depth.	1.30-4.00+

Trial Pit No 10301		Length 4.00 m	Width 0.40 m	Depth 2.50 m
Easting 566663.6785		Northing 179271.8763		m OD 7.526
Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth BGL
103011		Topsoil	Mid reddish brown clayey silt with occasional sub rounded and sub-angular flint (<60mm).	0.00-0.30
103012		Subsoil	Mid brownish grey clayey silt. No visible clast.	0.30-0.50
103013		Colluvial clay (Head)	Mottled mid greyish yellow silty clay with occasional manganese flecks	0.50-1.00
103014		Colluvial clay (Head)	Light brown clayey sand with common brownish white patches throughout	1.00-1.50
103015		Alluvial sand	Mid grey clayey sand with occasional mid reddish yellow sand and very abundant, moderately well sorted sub rounded flint gravel (<30mm). Gravel patches becoming less frequent with depth	1.50-2.50+

Trial Pit No 11300		Length 4.00 m	Width 2.00 m	Depth 4.00 m
Easting 566309.4		Northing 179679.2		m OD 20.0584
Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth BGL
1130001		Topsoil	Greyish mid brown silty clay. Frequent fine sub-angular flint clasts.	0.00-0.30
1130002		Subsoil	Yellowish brown silty clay. Frequent fine sub-angular flint clasts. Occasional chalk flecks.	0.30-1.00
1130003		Colluvial clay (Head)	Light yellowish brown sandy silt. Sand is coarse. Occasional fine sub-angular flint clasts.	1.00-1.60
1130004		?Colluvial clay (Head)	Mid yellowish red fine sandy clay. Moderately frequent fine sub-angular flint clasts.	1.60-4.00+

Trial Pit No 12300		Length 3.00 m	Width 1.80 m	Depth 3.00 m
Easting 564815.507		Northing 179939.369		m OD 24.526
Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth BGL
1230001		Topsoil	Mid brown silty clay. Frequent fine sub-angular flint clasts. Rooted.	0.00-0.45
1230002		Colluvial clay (Head)	Dark brown silty sand. Occasional fine sub-angular flint clasts. Loose.	0.45-1.10
1230003		Fluvial sand and gravel	Fine to medium sub-angular flint gravel. Yellowish red brown sand matrix. Loose.	1.10-1.50
1230004		?Thanet Sand	Light grey sand with yellow patches. Very occasional fine to medium sub-angular flint clasts.	1.50-3.00+

Trial Pit No 12301		Length 3.00 m	Width 1.80 m	Depth 4.00 m
Easting 565377.214		Northing 180003.374		m OD 21.880
Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth BGL
1230101		Topsoil	Mid greyish brown silty clay. Frequent sub-rounded and sub-angular flint clasts. Rooted.	0.00-0.40
1230102		Fluvial sand and gravel	Fine to medium sub-angular flint gravel in mid reddish brown sand matrix. Loose.	0.40-2.50
1230103		Fluvial sand and gravel	Fine to medium sub-angular flint gravel in Mid pale brown sand matrix. Loose.	2.50-3.20
1230104		?Thanet Sand	Pale grey brown fine sand.	3.20-4.00+

Trial Pit No 13303		Length 4.00 m	Width 3.50 m	Depth 3.00 m
Easting 563980.98		Northing 180359.02		m OD 24.690
Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth BGL
1330301		Topsoil	Mid to dark brownish grey silty clay loam (soft) with moderately frequent sub-angular to sub-rounded flint clasts (<60mm). Sharp contact.	0.00-0.35
1330302		Subsoil	Mid brown silty clay (firm) with occasional sub-angular to sub-rounded flint clasts (<40mm). Diffuse contact.	0.35-0.50
1330303		Colluvial clay (Head)	Pale brown silty clay (firm) with occasional sub-angular to rounded flint clasts (<40mm). Sharp contact.	0.50-0.70
1330304		Fluvial clay	Mid reddish brown silty sandy clay (firm to soft) with frequent patches of sub-angular to rounded flint clasts (<80mm) and pale yellow sand (soft). Abrupt contact.	0.70-1.20
1330305		Fluvial sand and gravel	Mid yellowish brown medium grained sand (loose) with frequent angular to rounded flint clasts (<300mm). Sharp contact.	1.20-1.60
1330306		Fluvial sand	Mid reddish brown to yellowish brown medium to fine grained sand (soft) with very occasional sub-angular to rounded flint clasts (<40mm). Sharp contact.	1.60-2.00
1330307		Fluvial sand and gravel	Mid reddish brown to yellowish brown medium sand (loose) with frequent to near complete sub-rounded to rounded flint clasts (<50mm). Sharp contact.	2.00-2.40
1330308		Fluvial sand	Mid yellowish brown medium grained sand (soft to loose) with occasional sub-angular to rounded flint clasts (<60mm). Becomes browner with depth.	2.40-3.00+

Trial Pit No 13306		Length 4.00 m		Width 1.00 m		Depth 3.00 m	
Easting 564410.58			Northing 180833.54			m OD 26.290	
Context Number	Fill Of/Filled With	Interpretative Category	Description			Depth BGL	
1330601		Topsoil	Dark brownish grey silty clay (firm) with occasional sub-angular to sub-rounded flint clasts (<40mm). Rooted. Diffuse contact.			0.00-0.20	
1330602		Subsoil	Mid grey silty clay (soft) with occasional sub-angular to sub-rounded flint clasts (<50mm). Rooted. Sharp contact.			0.20-0.40	
1330603		Colluvial clay (Head)	Mid brown to yellowish brown silty clay (firm) with occasional to frequent sub-angular to rounded flint gravels (<30mm) and very rare manganese flecks. Abrupt contact.			0.40-0.90	
1330604		Lambeth Group	Mid brown clay (stiff to very stiff) with very occasional sub-angular to rounded flint clasts (<30mm) and very occasional manganese flecks. Lenses of medium to fine grained orange brown to yellowish brown sand (soft) from 2.00m. Abrupt contact.			0.90-2.80	
1330605		Lambeth Group	Mid yellowish brown medium to fine grained sand (soft). Clast free.			2.80-3.00+	

Trial Pit No 13308		Length 5.00 m		Width 1.00 m		Depth 5.00 m	
Easting 563772.36			Northing 180590.73			m OD 25.920	
Context Number	Fill Of/Filled With	Interpretative Category	Description			Depth BGL	
1330801		Topsoil	Mid greyish brown silty clay (soft) with occasional sub-angular to sub-rounded flint clasts (<40mm). Rooted. Sharp contact.			0.00-0.35	
1330802		Colluvial clay (Head)	Mid brown silty clay (firm) with occasional sub-angular to rounded flint clasts (<40mm). Abrupt contact.			0.35-0.85	
1330803		Fluvial sand	Mid yellowish brown sand (loose). Sand is fine to medium. Occasional bands of sub-rounded to rounded flint gravels (<80mm) in a mid-brown sand. Sharp contact.			0.85-3.50	
1330804		Lambeth Group	Pale whitish grey sandy clay with a blue hue (stiff). Occasional sub-angular to rounded black flint gravel pebbles on lower interface (<40mm). Sharp contact.			3.50-4.60	
1330805		Lambeth Group	Pale bluish / greenish grey fine grained sand (soft) with occasional sub-angular to rounded black flint pebbles (<50mm).			4.60-5.00+	

Trial Pit No 14302		Length 5.00 m		Width 1.00 m		Depth 3.00 m	
Easting 562968.18			Northing 181239.82			m OD 26.140	
Context Number	Fill Of/Filled With	Interpretative Category	Description			Depth BGL	
1430201		Topsoil	Mid greyish brown silty sandy clay (soft) with occasional rounded to sub-angular flint clasts (<30mm). Sharp contact.			0.00-0.30	
1430202		Uncategorised	Colluvial clay (Head). Mid reddish brown silty clay (soft) with abundant to near complete sub-angular to rounded flint gravel (<30mm). Some clast free silty clay patches. Abrupt contact.			0.30-0.70	
1430203		Fluvial sand and gravel	Mid reddish brown to yellowish brown fine to medium grained silty sand (soft to loose) with occasional to moderately frequent bands of sub-angular to rounded flint gravel (<70mm). Becomes yellowish grey and more sandy after 2m bgl.			0.70-3.00+	

Trial Pit No 15300		Length 5.00 m		Width 1.00 m		Depth 2.30 m	
Easting 562706.30			Northing 181424.22			m OD 22.500	
Context Number	Fill Of/Filled With	Interpretative Category	Description			Depth BGL	
1530001		Topsoil	Mid to dark grey silty clay (soft) with sparse to occasional sub-angular to rounded flint clasts (<50mm). Rare CBM fragments. Abrupt contact.			0.00-0.30	
1530002		Subsoil	Pale brownish grey silty sandy clay (soft) with occasional sub-angular to rounded flint clasts (<40mm). Sharp contact.			0.30-0.48	
1530003		Colluvial clay (Head)	Pale yellowish grey sandy silty clay with pockets of sub-rounded to rounded flint clasts (<60mm). Clear to sharp horizon. Some variation in colour from yellow to grey. Could be interface between (1530002) and (1530004). Diffuse contact.			0.48-0.60	
1530004		Fluvial sand	Mid yellow medium to coarse sand with reddish brown and pale grey sand patches. Occasional sub-angular to rounded flint pebbles (<0.05). Abrupt contact.			0.60-1.30	
1530005		Fluvial sand and gravel	Mid brown medium to coarse sand (soft) with red patches. Moderately frequent sub-rounded to sub-angular flint clasts (<60mm). Sharp contact.			1.30-2.20	
1530006		Weathered London Clay	Pale blue clay (stiff) with mid reddish brown lenses and rare sub-angular to sub-rounded flint nodules (<300mm).			2.20-2.30+	

Trial Pit No 15301		Length 5.00 m	Width 1.00 m	Depth 1.80 m
Easting 562860.27		Northing 181479.12		m OD 21.920
Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth BGL
1530101		Topsoil	Mid to dark greyish silty clay (soft) with occasional to frequent rounded to sub-angular flint clasts (<40mm). Rare CBM fragments. Sharp contact.	0.00-0.30
1530102		Colluvial clay (Head)	Mid yellowish grey silty sandy clay (firm to stiff) with occasional to frequent sub-angular to rounded flint flecks and clasts (<40mm). Some patches of clay. Abrupt contact.	0.30-1.20
1530103		Fluvial sand	Mid brown silty fine sand (soft) with occasional pockets / patches of fine to very coarse sub-angular to rounded flint clast to (<100mm). Thin lenses / bands of stiff light blue clay. Sample 153011 taken at 1.30m. Sharp contact.	1.20-1.70
1530104		London Clay	Mid to light blue clay (stiff) with mid brown silt lenses and sparse manganese flecks.	1.70-1.80+

Trial Pit No 15303		Length 5.00 m		Width 1.00 m		Depth 4.40 m	
Easting 562706.36			Northing 181934.69			m OD 12.060	
Context Number	Fill Of/Filled With	Interpretative Category	Description			Depth BGL	
1530301		Ploughsoil/ Topsoil	Mid greyish brown silty clay (soft) with occasional sub-angular to rounded flint clasts (<50mm). Ploughed in vegetation. Sharp contact.			0.00-0.30	
1530302		Colluvial silt (Head)	Mid to pale yellowish brown clay silt (stiff) with very occasional sub-angular to rounded flint clasts (<40mm). Rooted. Diffuse contact.			0.30-0.70	
1530303		Weathered London Clay	Pale yellowish brown clay (very stiff) with mid grey lenses containing manganese flecks and occasional sub-angular to rounded flint clasts (<40mm). Becomes brownish grey with fissures from 0.90m. Abrupt contact.			0.70-1.30	
1530304		London Clay	Mid greyish brown clay (very stiff) with fissures, blue mottling and lenses / laminations of medium grained white and yellow gypsum. Becomes finer grained and more orange brown lenses / laminations from 2.10m. Diffuse contact.			1.30-3.40	
1530305		London Clay	Mid bluish grey clay with fine silt content (stiff) with small rootlets, mid orange brown laminations, and rare to sparse sub-rounded crystalline concretions (whitish brown exterior with mid grey interior). Slightly tabular / blocky.			3.40-4.40+	

Trial Pit No 15306		Length 4.00 m		Width 0.60 m		Depth 4.00 m	
Easting 563143.89			Northing			m OD 9.570	
Context Number	Fill Of/Filled With	Interpretative Category	Description			Depth BGL	
153061		Topsoil	Dark brown slightly gravelly silty clay. Occasional sub-rounded fine to medium flint clasts (<50mm). Abrupt contact.			0.00-0.30	
153062		Colluvial clay (Head)	Yellowish brown slightly gravelly clay. Occasional fine to medium angular, sub-angular and sub-rounded rounded flint clasts (30mm). Diffuse contact			0.30-1.00	
153063		London Clay	Sandy clay with patches of coarse sandy gravel. Gravel is fine to medium rounded flint clasts (30mm).			1.00-4.00+	
153064	153065	Cut	Machine cut for test pit excavated during LTC Phase 2 GI			0.30-4.00+	
153065	153064	Backfill	Mix of greyish and yellowish brown gravelly clay.			0.30-4.00+	

Trial Pit No 16307		Length 4.00 m		Width 0.90 m		Depth 4.00 m	
Easting 562395.43			Northing 182780.94			m OD 3.290	
Context Number	Fill Of/Filled With	Interpretative Category	Description			Depth BGL	
1630701		Topsoil	Mid grey brown sandy silty clay. Rooted. Abrupt contact.			0.00-0.40	
1630702		Alluvial clay	Mid to light brown slightly sandy silty clay. Diffuse contact.			0.40-0.60	
1630703		Alluvial clay	Mid grey with brown hue sandy silty clay. Stiff. Abrupt contact.			0.60-1.00	
1630704		Alluvial sand	Mid brown with grey hue slightly clayey sand. Very occasional fine sub-angular and sub-rounded flint clasts. Abrupt contact.			1.00-1.20	
1630705		Colluvial clay (Head)/ Weathered London Clay	Mid brown grey sandy clay. Diffuse contact.			1.20-2.50	
1630706		London Clay	Mid grey brown clay.			2.50-4.00+	

Trial Pit No 19300		Length 6.00 m		Width 0.70 m		Depth 3.00 m	
Easting 560081.766			Northing 183865.589			m OD 18.965	
Context Number	Fill Of/Filled With	Interpretative Category	Description			Depth BGL	
1930001		Topsoil	Stiff brown slightly sandy slightly gravelly clay. Gravel is sub-angular to rounded fine to medium flint with rare brick fragments. Sand is fine to coarse. Occasional rootlets. Abrupt contact.			0.00-0.30	
1930002		Colluvial clay (Head)	Firm light brown and orangish brown slightly sandy locally sandy clay. Sand is fine. Gravel is sub-angular to rounded fine to coarse of flint. Abrupt contact.			0.30-1.80	
1930003		London Clay Firm brown clay	Occasional undulating randomly orientated light grey silt partings. Rare pockets of dark brown organic matter. Abrupt contact.			1.80-2.70	
1930004		London Clay	Stiff brown locally mottled orangish brown and grey slightly gravelly clay. With occasional horizontally aligned firm to stiff lithorelicts. Occasional pockets of light grey silt of degraded calcareous claystone with occasional fine gravel fragments. Rare pockets of orangish brown silt. Gravel is fine to coarse rounded flint. Excavated as lumps.			2.70-4.00+	

Trial Pit No 19301		Length 6.00 m	Width 0.70 m	Depth 3.00 m
Easting 559889.842		Northing 183872.565		m OD 22.070
Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth BGL
1930101		Topsoil	Stiff brown slightly sandy slightly gravelly clay. Gravel is sub-angular to rounded fine to medium of flint and brick. Sand is fine to coarse. Frequent rootlets. Abrupt contact.	0.00-0.30
1930102		Colluvial clay (Head)	Stiff light brown slightly sandy gravelly clay with rare pockets of orangish brown silty sandy clay. Sand is medium to coarse. Gravel is sub-angular to rounded fine to coarse of flint. Abrupt contact.	0.30-0.60
1930103		Fluvial sand	Brown gravelly locally clayey fine to coarse sand. Gravel is sub-rounded to rounded fine to coarse flint. Abrupt contact. Undulating boundary between 1.00 and 1.30 m bgl.	0.60-1.20
1930104		Fluvial sand	Light grey clayey fine sand. Occasional lenses of firm light grey sandy clay. Abrupt contact.	1.20-1.30
1930105		London Clay	Firm fissured brown mottled orangish brown locally grey and bluish grey slightly sandy clay with rare lenses of orangish brown silt. Fissures 0-30° very closely to closely spaced planar bluish grey gleyed. Sand is fine to medium, rare rootlets. Diffuse contact.	1.30-1.70
1930106		London Clay	Firm fissured brown mottled grey locally bluish grey clay with numerous horizontally aligned firm to stiff lithorelicts. Rare lenses of brown clayey silt. Fissures are randomly orientated extremely closely spaced to very closely spaced undulating smooth grey locally bluish grey gleyed. Excavated as lumps. Diffuse contact.	1.70-2.50
1930107		London Clay	Firm fissured brown mottled bluish grey clay with numerous horizontally aligned firm to stiff lithorelicts. Trace lenses of orangish brown silt. Fissures are 0-10° very closely spaced undulating smooth bluish grey gleyed. Fissures are 40-60° probably closely spaced planar smooth gleyed. Rare orangish brown iron rich lignite nodules. Excavated as lumps.	2.50-3.00+

Trial Pit No 19302		Length 6.00 m	Width 0.70 m	Depth 4.00 m
Easting 560207.757		Northing 183975.828		m OD 17.265
Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth BGL
1930201		Topsoil	Firm brown slightly sandy gravelly clay. Sand is fine to coarse. Gravel is sub-angular to rounded fine and medium flint and rare brick. Occasional rootlets.	0.00-0.21
1930202		Colluvial clay (Head)	Yellowish brown slightly sandy slightly gravelly clay with rare pockets (<10x10x10mm) or orangish brown silt. Sand is fine. Gravel is fine to coarse rounded flint.	0.21-2.40
1930203		London Clay	Stiff brown locally mottled light bluish grey clay.	2.40-4.00+

Trial Pit No 19303		Length 5.00 m		Width 1.50 m		Depth 4.00 m	
Easting 560459.205			Northing 183901.150			m OD 13.785	
Context Number	Fill Of/Filled With	Interpretative Category	Description			Depth BGL	
1930301		Topsoil	Ploughsoil. Firm dark grey brown slightly sandy slightly gravelly silty clay. Sand is fine. Gravel is sub-angular to rounded common fine to medium flint. Rare sub-angular to rounded chalk flecks and fragments. Abrupt contact.			0.00-0.40	
1930302		Colluvial clay (Head)	Stiff mid brown mottled orangish brown slightly sandy slightly gravelly clay. Sand is fine to medium. Gravel is sparse sub-angular to rounded fine to coarse flint. Head. Diffuse contact.			0.40-0.80	
1930303		London Clay	Stiff mid grey brown mottled orangish brown with blue grey gleying on fissure edges slightly gravelly clay. Gravel is sub-angular to rounded fine to medium flint. Diffuse contact.			0.80-1.10	
1930304		London Clay	Very stiff fissured grey mottled orangish brown locally bluish grey clay. Common pockets of white calcareous silts. Diffuse contact.			1.10-1.70	
1930305		London Clay	Very stiff mid brown locally blue grey gleyed very closely to closely fissured clay. Rare pockets of mid orangish brown fine sand. From 2.30-2.60 m bgl band of rare sub-angular to rounded fine to coarse claystone. Diffuse contact.			1.70-2.60	
1930306		London Clay	Mid brownish grey very stiff extremely closely to very closely spaced fissured clay. Locally mid blue grey gleying on fissure edges. Rare fine sugary selenite crystals. Rare sub-rounded to rounded fine to coarse claystone. Diffuse contact.			2.60-3.60	
1930307		London Clay	Dark grey fissured clay. Locally bluish grey gleyed on fissure edges. Extremely stiff. Excavates as sub-angular tabular blocks.			3.60-4.00+	

Trial Pit No 20300		Length 6.00 m	Width 0.70 m	Depth 4.00 m
Easting 558906.903		Northing 183939.752		m OD 22.718
Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth BGL
2030001		Topsoil	Dark brown silty sandy clay (soft) with moderate rooting and occasional rounded to sub-angular flint clasts (<30mm). Diffuse contact.	0.00-0.20
2030002		Subsoil	Mid brown silty sandy clay (soft) with occasional to sparse sub-angular to sub-rounded flint clasts (<40mm). Interface with (2030002) is more silty sand and no gravels. Diffuse contact.	0.20-0.35
2030003		Colluvial clay (Head)	Mid orange brown silty clay with slight sand content. Patches / pockets of rounded flint gravels (<50mm) and rare manganese flecks. Sharp contact.	0.35-0.85
2030004		Fluvial clay	Mid orange brown sandy clay (firm to soft) with bands of pale brownish grey sandy clay and occasional manganese flecks / lenses. Sharp contact.	0.85-1.70
2030005		Fluvial sand	Loose pale yellowish grey sand (soft) with no coarse components. Bands of mid orange brown compacted sand (<0.03 m thick). At approx. 3.50 m becomes pale yellowish grey and damp for approx. 0.20 m. Sharp contact.	1.70-3.70
2030006		Fluvial sand	Pale bluish grey clay sand (firm) with lenses of mid orange brown and pale greyish brown clay sand. Sparse sub-rounded to rounded flint pebbles (<50mm).	3.70-4.00+

Trial Pit No 21300		Length 4.00 m		Width 1.50 m		Depth 3.00 m	
Easting 558392.454			Northing 184488.111			m OD 21.345	
Context Number	Fill Of/Filled With	Interpretative Category	Description			Depth BGL	
2130001		Topsoil	Stiff dark brown slightly sandy slightly gravelly silty clay. Sand is fine to medium. Frequent sub-angular to rounded fine to coarse flint clasts. Very rare chalk and brick fragments. Diffuse contact.			0.00-0.30	
2130002		Colluvial clay (Head)	Stiff mid orangish brown mottled brown slightly gravelly, locally gravelly slightly sandy clay. Sand is fine to medium. Gravel is frequent sub-rounded to rounded fine to coarse flint. Diffuse contact.			0.30-0.90	
2130003		Fluvial sand	Light orange brown mottled light grey clayey sand. Sand is fine to medium. Diffuse contact			0.90-2.50	
2130004		Fluvial sand	Light to mid yellowish brown fine to medium sand.			2.50-3.00+	

Trial Pit No 21301		Length 4.00 m		Width 0.50 m		Depth 4.00 m	
Easting 558188.288			Northing 185136.818			m OD 23.198	
Context Number	Fill Of/Filled With	Interpretative Category	Description			Depth BGL	
2130101		Topsoil	Soft brown slightly sandy slightly gravelly silt. Frequent rootlets.			0.00-0.30	
2130102		Colluvial clay (Head)	Firm yellowish brown mottled orangish brown slightly sandy gravelly clay with occasional rounded flint cobbles(<45x60x115mm). Sand is fine and medium. Gravel is sub-rounded and rounded fine to coarse flint. Occasional pockets (<5x5x10mm) of black partially decomposed organic material.			0.30-1.10	
2130103		Colluvial clay (Head)	Soft orangish brown mottled light grey (sandy clay with rare pockets (<5x5x10mm) of black partially decomposed organic material. Sand is fine and medium. 2.00-3.30m; locally tending to clayey fine sand.			1.10-3.30	
2130104		Fluvial sand	Yellowish brown and orangish brown locally clayey fine and medium sand.			3.30-4.00+	

Trial Pit No 21302		Length 6.00 m		Width 0.50 m		Depth 4.00 m	
Easting 558311.737			Northing 185426.648			m OD 23.797	
Context Number	Fill Of/Filled With	Interpretative Category	Description			Depth BGL	
2130201		Topsoil	Soft brown slightly sandy clayey silt with rare sub-angular to rounded fine and medium flint gravel. Frequent rootlets.			0.00-0.35	
2130202		Colluvial clay (Head)	Soft light yellowish brown mottled orangish brown slightly sandy clay with occasional pockets of black partially decomposed organic material. Sand is fine and medium. Rare sub-angular to rounded fine and medium flint gravel. Frequent becoming rare rootlets.			0.35-1.00	
2130203		Colluvial clay (Head)	Firm orangish brown mottled light yellowish brown slightly sandy gravelly clay with occasional pockets (<5x5x10mm) of partially decomposed organic material. Sand is fine and medium. Gravel is sub-rounded and rounded fine and medium flint.			1.00-1.20	
2130204		Colluvial Clay (Head)	Firm orangish brown mottled light yellowish brown (10YR 5 / 4) slightly sandy clay with occasional pockets (5x5x10mm) of black partially decomposed organic material. Sand is fine and medium. 1.50-1.70m; sandy.			1.20-1.70	
2130205		Fluvial clay	Orangish brown and light grey fine and medium sand with very closely to medium spaced thick laminations to thin beds of light grey mottled orangish brown slightly sandy slightly gravelly clay. Sand is fine and medium. Gravel is sub-angular and sub-rounded fine and medium flint. Rare pockets (<5x10x10mm) of black partially decomposed organic material. 3.40-4.00m; sand is light yellowish brown mottled light grey locally orangish brown.			1.70-4.00+	

Trial Pit No 21303		Length 4.00 m	Width 1.50 m	Depth 4.00 m
Easting 558878.730		Northing 186637.607		m OD 8.102
Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth BGL
2130301		Topsoil	Firm mid to dark brown mottled grey brown and orangish brown slightly sandy slightly gravelly silty clay. Sand is fine to coarse. Gravel is sparse sub-angular to rounded fine to medium flint clasts. Rare brick fragments. Very rare glass, fabric, metal and plastic fragments. Diffuse contact.	0.00-0.30
2130302		Weathered London Clay	Stiff mid to dark yellowish brown mottled mid orangish brown slightly sandy slightly gravelly locally gravelly (0.90-1.10m bgl) clay. Sand is fine to medium. Gravel is moderate sub-angular to rounded fine to medium flint. Rare pockets of dark grey clay. Diffuse contact.	0.30-1.80
2130303		London Clay	Very stiff mid yellowish brown mottled light bluish grey fissured clay. Very rare sugary selenite crystals. Very rare sub-rounded to rounded fine to coarse claystone. Diffuse contact.	1.80-2.90
2130304		London Clay	Very stiff fissured brown clay, mottled bluish grey and orangish brown. Fissures are extremely closely and very closely spaced gleyed bluish grey on edges. Excavates as fragments.	2.90-4.00+

Trial Pit No 21304		Length 4.00 m	Width 0.50 m	Depth 4.00 m
Easting 558973.713		Northing 186707.643		m OD 8.044
Context Number	Fill Of/Filled With	Interpretative Category	Description	Depth BGL
2130401		Topsoil	Mid brown grey sandy silty clay. Rooted. Chalk flecks. Occasional fine to medium sub-angular to sub-rounded flint clasts. Modern brick fragment. Diffuse contact.	0.00-0.30
2130402		Alluvial clay	Mid to light brown clay. Slightly sandy. Fine sand component. Moderately frequent fine sub-rounded and occasional sub-angular flint clasts. Diffuse contact.	0.30-1.00
2130403		Alluvial clay	Mid greyish brown sandy silty clay. Stiff. Chalk flecks. Diffuse contact.	1.00-1.70
2130404		Uncategorised	Alluvial clay. Mid to light greyish brown clay. Stiff. Patches of yellow brown fine sand. Diffuse contact.	1.70-2.80
2130405		Weathered London Clay	Mid greyish brown slightly sandy clay. Occasional small sub-angular flint clasts and chalk flecks. Occasional fine to medium sub-angular claystone with dogtooth calcinite. Diffuse contact.	2.80-3.10
2130406		London Clay	Light bluish grey slightly sand clay. Firm. Fine sand component.	3.10-4.00+

Trial No 21305		Length 4.00 m		Width 1.50 m		Depth 4.00 m	
Easting 558921.383			Northing 186728.801			m OD 8.530	
Context Number	Fill Of/Filled With	Interpretative Category	Description			Depth BGL	
2130501		Topsoil	Mid brown grey sandy silty clay. Sand is fine to medium. Rooted. Frequent fine to medium sub-rounded flints. Fragments of brick / CBM and modern glass. Diffuse contact.			0.00-0.30	
2130502		Colluvial clay (Head)	Mid brown sandy clay. Sand is fine. Clay is firm. Occasional fine sub-angular flint clasts. Occasional chalk flecks. Diffuse contact.			0.30-1.30	
2130503		London Clay	Mid brown clay with grey steaks. Firm. Diffuse contact.			1.30-2.50	
2130504		London Clay	Mid blue-grey slightly sandy with brown hue. Sand is fine. Coarsely laminated. Diffuse contact.			2.50-3.20	
2130505		London Clay	Dark yellow-brown clay stone with dogtooth calcite. Clay stone is large and sub-angular. Abrupt contact.			3.20-3.50	
2130506		London Clay	Mid bluish grey slightly sandy clay. Sand is very fine. Firm.			3.50-4.00+	

Trial Pit No BH19301		Length 3.00 m		Width 0.30 m		Depth 1.20 m	
Easting 559901.98			Northing 183807.259			m OD 21.608	
Context Number	Fill Of/Filled With	Interpretative Category	Description			Depth BGL	
71930101		Topsoil	Firm dark brown slightly sandy slightly gravelly silty clay. Sand is fine and medium. Gravel is sub-angular to sub-rounded fine to coarse flint, Chalk and rare brick. Frequent rootlets. Abrupt contact.			0.00-0.30	
71930102		Head	Stiff yellowish brown mottled light grey locally orangish brown slightly sandy slightly gravelly clay. Sand is fine and medium. Gravel is sub-angular to sub-rounded fine and medium flint and rare chalk. Rare pockets of black organic matter. Rare rootlets. Diffuse contact.			0.30-0.80	
71930103		London Clay	Stiff light grey mottled orangish brown slightly sandy clay.			0.80-1.20+	

Appendix B

Phase 3 Borehole Tables

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04300	
Coordinates (NGR) X: 568000.123		Coordinates (NGR) Y: 172967.328		Level (top): 11.88	
Length: -		Width: -		Depth: 50 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90430001	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		-
90430002	Dark reddish brown slightly gravelly clayey sand. Sand is fine to medium. Gravel is moderate subangular to sub-rounded fine to coarse flint. Soft. Abrupt contact.	?Colluvial sand (Head)	1.20-1.65		-
90430003	Light yellowish brown mottled white slightly sandy silty clay. Sand is fine. Gravel is rare sub-rounded to rounded fine chalk and sparse sub-angular to rounded fine to coarse flint. Firm. Abrupt contact.	Fluvial clay/solifluction deposit	1.65-2.50		-
90430004	Core loss.		2.50-3.00		-
90430005	Firm dark brown mottled light yellowish brown and mid brown slightly gravelly slightly sandy silty clay. Sand is fine. Gravel is abundant fine to medium sub-rounded to rounded chalk, occurring in pockets of whitish brown silty clay and randomly throughout deposit. Gravel is also sparse sub-angular to rounded fine to coarse flint. Sharp contact.	Fluvial clay/solifluction deposit	3.00-4.00		-
90430006	Stiff off white mottled yellowish chalk. Rare sub-angular to rounded coarse flint. Chalk clasts are fine to medium.	Chalk bedrock, upper part possibly soliflucted.	4.00-5.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04304	
Coordinates (NGR) X: 567925.145		Coordinates (NGR) Y: 173076.37		Level (top): 7.84	
Length: -		Width: -		Depth: 50 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		-
90430401	Olive brown silty clay.	Alluvial clay	1.20-1.70		-
90430402	Firm laterally friable olive brown silty clay. No visible structure.	Alluvial clay	1.70-2.50		-
90430403	Firm laterally friable olive brown silty clay. No visible structure.	Alluvial clay	2.50-2.70		-
90430404	Structureless chalk.	Soliflucted/ weathered chalk	2.70-3.20		-
90430405	Chalk.	Chalk bedrock	3.20-4.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04305	
Coordinates (NGR) X: 567923.171		Coordinates (NGR) Y: 173162.26		Level (top): 5.15	
Length: -		Width: -		Depth: 50 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		-
9430501	Very stiff dark orangish brown slightly gravelly, locally gravelly slightly sandy silty clay. Sand is fine. Gravel is common sub-angular to angular fine to coarse flint. Diffuse contact.	Colluvial gravelly clay	1.20-2.50		-
90430502	Mid yellowish brown silty fine to medium sand. Very rare fine rounded flint. Diffuse contact.	?Colluvial sand	2.50-2.95		-
90430503	Firm dark brownish grey mottled light grey slightly gravelly sandy silty clay. Sand is fine to medium, locally coarse. Gravel is sparse sub-angular to sub-rounded fine to coarse flint. At 3.35-3.40 m bgl band of mid yellowish brown fine to medium sand. Abrupt contact.	?Colluvial gravelly clay	2.95-3.40		-
90430504	Firm mid to dark brown slightly sandy silty clay. Sand is fine to medium. 3.70 and 4.00: core loss; may be the same unit as (90430505) Abrupt contact	Alluvial clay	3.40-3.70		-
90430505	Firm mid brown slightly sandy silty clay. Sand is fine to medium. Abrupt contact.	Alluvial clay	4.00-4.60		-
90430506	Firm mid brown mottled orangish brown slightly sandy silty clay. Sand is fine to medium. Shows clear laminations, possibly very thinly bedded. Thin bands of light grey brown clay. Some of what appears to be iron staining. Around 5.30 m bgl thin 0.05 m thick band of slightly gravelly sandy clay where gravel is common; very fine rounded chalk. Abrupt contact.	Alluvial sand	4.60-5.40		-
90430507	White chalk. No visible flint in borehole cores present (to 7.70 m bgl). Structureless chalk composed of creamy slightly gravelly sandy silt. Gravel is very weak, low-density, white, rounded. Locally light brown with a trace of brown clay.	Chalk bedrock; upper part may be brecciated and/or soliflucted	5.40-7.70+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04306	
Coordinates (NGR) X: 568012.56		Coordinates (NGR) Y: 173157.86		Level (top): 4.98	
Length: -		Width: -		Depth: 40 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	0.00-1.45: hand dug trial pit.	Hand dug trial pit	0.00-1.45		-
90430601	Firm orange slightly silty sand. Sand is medium to coarse with common grey patches, no visible structure	Alluvial sand	1.45-1.60		-
90430602	Stiff orange brown slightly clayey sand, occasional very faint fine laminations.	Alluvial sand	1.60-2.70		-
90430603	Firm red brown slightly sandy clay (sand is fine) becoming clayey sand towards base. No visible structure.	Alluvial sand	2.70-3.70		-
90430604	Firm red brown clayey fine sand, no visible structure.	Alluvial sand	3.70-5.50		-
90430605	Orange brown sandy gravel becoming clayey sandy gravel, gravel is fine to medium sub-angular to sub-rounded flint (<30mm).	Fluvial gravel	5.50-6.25		-
90430606	Firm dark yellow brown silty clay occasional sandy patches and fine sub-angular to angular gravels.	Fluvial clay	6.25-7.75		-
90430607	Structureless chalk.	Weathered chalk bedrock	7.75-8.50+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04307	
Coordinates (NGR) X: 568013.59		Coordinates (NGR) Y: 173263.68		Level (top): 2.28	
Length: -		Width: -		Depth: 40 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90430701	Mid brown friable to firm silty clay. Rooted.	Topsoil	0.00-0.20		-
90430702	Mid brown firm silty clay.	Subsoil	0.20-0.50		-
90430703	Mid brownish grey firm silty clay.	Alluvial clay	0.50 - 1.20		-
90430704	Mid grey soft clay.	Alluvial clay	1.20-2.50		-
90430705	Sub-rounded and sub-angular fine to medium flint gravel (10-70mm), with occasional large sub-rounded flint nodules (<120mm). Matrix is coarse brown sand and grits.	?Fluvial gravel	2.50 - 3.50		-
90430706	Laminated fine grey and yellowish orange sand.	Alluvial sand (?estuarine)	3.50 - 4.00		90430701
90430707	Fine firm mid greenish grey sandy clay. Clast free. Yellow streaks from 6.0m and starts breaking into clusters around Fe concentrations at 6.5m.	Alluvial clay	4.00 - 7.70		90430702 (UT100 shoe) 90430703 (bulk)
90430708	Chalk.	Chalk bedrock	7.70-9.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04308	
Coordinates (NGR) X: 568012.87		Coordinates (NGR) Y: 173223.33		Level (top): 2.42	
Length:		Width:		Depth: 40 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	Hand dug trial pit.	Hand dug trial pit	0.00- 1.50		-
90430801	Stiff silty clay, fine lateral cracking possible indication of laminations. Heavy Fe mottling on exposure.	Alluvial clay	1.50- 3.00		-
90430802	Grey brown silty clay, possible evidence of fine laminations. Heavy oxidation on exposure.	Alluvial clay	3.00- 4.50		-
90430803	Firm homogenous grey brown clay, possible laminations from 5,7 - 6.0m. Clay becomes darker and more organic with depth.	Alluvial clay	4.50- 6.00		-
90430804	Firm dark grey organic clay.	Alluvial clay	6.00- 6.30		-
90430805	Yellow brown sands and gravels.	Fluvial sand and gravel	6.30- 6.47		-
90430806	Light brown/white loose chalk gravels/structureless chalk.	Solifluction deposits	6.47- 7.50		-
90430807	Chalk.	Chalk bedrock	7.50- 9.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04309	
Coordinates (NGR) X: 567931.95		Coordinates (NGR) Y: 173237.40		Level (top): 2.84	
Length: -		Width: -		Depth: 10 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90430901	Mid brownish grey silty clay (firm and dry). Clast free. Moderately rooted. Diffuse contact.	Topsoil	0.00- 0.25		-
90430902	Mid brownish grey clay silt (compact) containing occasional sub-rounded to sub-angular flint clasts(<50mm). Sharp contact.	Subsoil	0.25- 0.80		-
90430903	Mid brown silty clay (firm to soft) with a slight sand component. Contains occasional sub-angular and sub-rounded flint clasts (<70mm). Diffuse contact.	Colluvial clay	0.80 - 1.20		-
90430904	Mid brown silty sandy clay (soft) with frequent sub-angular and sub-rounded flint clasts (<60mm).	Colluvial clay	1.20- 2.50		90430901
90430905	Light brown sandy clay (soft) with occasional sub-rounded to sub-angular flint clasts (<40mm).	Fluvial sand	2.50- 3.00		90430902
90430906	Sub-angular and sub-rounded flint gravel (<60mm) in mid brown sand (soft) matrix.	Fluvial gravel	3.00- 3.50		-
90430907	Mid brown (with grey hue) clay sand (compact) with very occasional sub-rounded to sub-angular flint flecks. Becomes compact sand with depth but transition difficult to distinguish.	Fluvial sand	3.50 - 5.50		90430903
90430908	Off white chalk marl (compact) with occasional sub-rounded to sub-angular flints (<60mm) in upper 1.50m.	Brecciated/ soliflucted chalk, becoming chalk bedrock.	5.50- 8.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04310		
Coordinates (NGR) X: 567936.80		Coordinates (NGR) Y: 173259.41		Level (top): 2.33		
Length: -		Width: -		Depth: 9 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
90431001	Mid brownish grey silty clay (firm) containing occasional sub-angular to sub-rounded flint clasts (<30mm). Some rooting. Diffuse contact.	Topsoil	0.00- 0.22		-	
90431002	Mid grey clay silt (firm). Clast free. Abrupt contact.	Subsoil	0.22- 0.90		-	
90431003	Pale bluish grey clay silt (firm to soft) with thin mid brown lenses. Clast free.	Alluvial silt	0.90- 2.00		-	
90431004	Mid greyish brown silty clay (soft to firm) with occasional sub-angular to sub-rounded flint clasts (<50mm).	Alluvial clay	2.00- 3.70		-	
90431005	Mid bluish grey clay (compact) with traces of fine sand and occasional rounded and sub-angular flint clasts (<40mm).	Alluvial clay	3.70- 4.50		-	
90431006	Mid bluish grey sandy silty clay (compact). Could possible same as 90431005 but sandier.	Alluvial clay	4.50- 6.20		90431001 90431002	
90431007	Chalk marl (firm) with occasional sub-angular to sub-rounded flint nodules (<150mm).	Chalk bedrock, upper part may be soliflucted/ brecciated	6.20 +		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04311	
Coordinates (NGR) X: 567946.08		Coordinates (NGR) Y: 173309.69		Level (top): 2.12	
Length: -		Width: -		Depth: 40 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		-
90431101	Soft dark grey organic silty clay, no visible laminations.	Alluvial clay	1.20-1.50		-
90431102	Soft dark brown organic silty clay.	Peat	1.50-1.62		90431101
90431103	Soft dark grey silty clay occasional fine dark laminations.	Alluvial clay	1.62-2.60		-
90431104	Soft very dark brown/black silty clay.	Peat	2.60-2.73		90431102
90431105	Soft medium grey silty clay, occasional light brown sandy patches.	Alluvial clay	2.73-4.50		-
90431106	Firm dark grey slightly sandy silty clay, sand is fine.	Alluvial clay	4.50-5.13		-
90431107	Chalk gravel.	Soliflucted/ weathered chalk	5.13-6.00		-
90431108	Chalk.	Chalk bedrock	6.00-8.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04312	
Coordinates (NGR) X: 568017.60		Coordinates (NGR) Y: 173368.39		Level (top): 2.31	
Length: -		Width: -		Depth: 45 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90431201	Mid brown friable to firm clayish silt. Rooted.	Topsoil	0.00-0.20		-
90431202	Firm mid brown silty clay.	Subsoil	0.20-0.80		-
90431203	Firm mottled brown and bluish grey clay.	Alluvial clay	0.80-1.70		-
90431204	Soft mid grey clay.	Alluvial clay	1.70-3.00		-
90431205	Middle brown soft to firm pseudo fibrous peat.	Peat	3.00-4.50		90431201
90431206	Firm to soft mid bluish grey clay, upper transition from peat is slightly silty with fine flint gravel. 4.90: becomes generally clast free.	Alluvial clay	4.50-6.00		
90431207	Firm yellowish grey sandy clay with frequent-sub rounded flint clasts (5-40mm). Lower part has clear laminations of mid grey and mid yellowish brown sandy clay.	Fluvial clay	6.00-9.50		90431202 , 90431203
90431208	Firm brownish grey silty clay with some laminations.	Alluvial clay	9.50-13.00		90431204, 90431205
90431209	Firm mid grey sandy silt with gritty black inclusions and some shell, becoming more clayey towards base.	Alluvial silt	13.00-16.90		90431206, 90431207
90431210	Firm grey clay with black fine sand laminations (1cm approx. for each lamination). Sand contains occasional rounded chalk clasts (<50mm). 18.40: thick band of organic sand - sampled from end of UT100 in 90431209	Alluvial sand (?estuarine)	16.90-18.80		90431208, 90431209
90431211	Firm grey clay with black fine sand laminations (1cm approx. for each lamination). Chalky, likely colluvial units. Compact.	Alluvial and colluvial sand	18.80-19.50		90431210 (from shoe)
90431212	Lens of sub-rounded flint gravel. Clasts 10-70mm.	Alluvial and colluvial sand	19.50-19.60		-
90431213	Chalk.	Chalk bedrock	19.60-20.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04313	
Coordinates (NGR) X: 568009.15		Coordinates (NGR) Y: 173323.50		Level (top): 2.20	
Length: -		Width: -		Depth: 50 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	0.00-1.50: Hand dug trial pit.	Hand dug trial pit	0.00-1.50		-
90431301	Stiff grey brown silty clay. Structureless. Fe mottling.	Alluvial clay	1.50-2.00		-
90431302	Firm grey silty clay. Structureless	Alluvial clay	2.00-2.69		-
90431303	Very dark brown/black organic silty clay.	Peat	2.69-3.00		-
90431304	Grey brown silty clay. Occasional feint fine laminations. Heavy oxidation.	Alluvial clay	3.00-4.50		-
90431305	Fine yellow brown sand. 5.11: becoming orange brown in colour.	Alluvial sand	4.50-6.00		-
90431306	Stiff grey brown silty clay. Frequent sub-rounded, occasionally sub-angular flint clasts.	Colluvial clay (Head)	6.00-9.00		-
90431307	Sub-angular and sub-rounded poorly sorted flint gravel in a light brown silty clay matrix.	Colluvial gravel (Head)	9.00-9.70		-
90431308	Loose wet light brown/white chalk gravels.	Soliflucted chalk	9.70-10.50		-
90431309	Chalk.	Chalk bedrock	10.50-12.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04314	
Coordinates (NGR) X: 567912.94		Coordinates (NGR) Y: 173347.96		Level (top): 2.13	
Length: -		Width: -		Depth: 50 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90431401	Dark grey clay silt (compact and dry) with moderate rooting. Abrupt contact.	Topsoil	0.00- 0.10		-
90431402	Dark greyish brown clay silt (compact and dry) with manganese staining and lenses.	Subsoil	0.10- 0.30+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04315	
Coordinates (NGR) X: 567972.92		Coordinates (NGR) Y: 173412.63		Level (top): 2.08	
Length: -		Width: -		Depth: 15 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		-
90431501	Mid greenish grey clay. <1% chalk flecks and occasional rootlets. Moderately consolidated. Rare peaty inclusions. Structureless. Abrupt contact.	Alluvial clay	1.20-5.80		-
90431502	Light greenish grey silty clay. <15% chalk flecks. 5% fine to coarse (5-50mm) angular to rounded flint clasts. Diffuse contact.	Alluvial clay	5.80-6.40		-
90431503	Mid-light reddish grey medium sandy clay. <5% coarse (40-60mm) sub-angular flint clasts. Moderately consolidated. Abrupt contact.	Alluvial clay	6.40--6.80		-
90431505	Mid-light reddish green silty clay. <1% chalk flecks. Moderately consolidated. Sharp contact.	Alluvial clay	6.80-7.90		-
90431506	Dark greyish black organic clay. Clast free. Moderately consolidated. Sharp contact.	Alluvial clay	7.90-8.00		-
90431507	Mid-light greenish red silty clay. Clast free. Moderately consolidated. Diffuse contacts	Alluvial clay	8.00-11.60		-
90431508	Mid greyish green silty clay with orange mottling. Clast free. Diffuse contact.	Alluvial clay	11.60-12.30		90431501
90431509	Dark greyish green silty clay. Clast free. Well consolidated.	Alluvial clay	12.30-15.00+		904315029 043150390 431504904 315059043 1506 904315079 043150890 431509

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04316		
Coordinates (NGR) X: 568011.62		Coordinates (NGR) Y: 173479.16		Level (top): 2.00		
Length:		Width:		Depth: 45 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
90431601	Grass over firm light brown slightly sandy clay with very occasional fine sub-rounded flint clasts (<15mm).	Topsoil	0.00-0.35		-	
90431602	Firm dark greyish red mottled slightly sandy clay.	Subsoil	0.35-0.70		-	
90431603	Soft dark grey silty clay. Clast free.	Alluvial clay	0.70-5.80		-	
90431604	Very soft dark brown clayey peat. 7.70 becoming silty and gravelly.	Peat and alluvial organic clay	5.80-8.40		90431601	
90431605	Sub-rounded and sub-angular fine flint gravel (20-70mm) in brownish grey fine to coarse sand matrix.	Fluvial gravel	8.40-9.50		-	
90431606	Mid greenish grey slightly sand clay with occasional brown mottling, becomes slightly micaceous from 15.50m. Laminations throughout, particularly towards lower part of deposit	Alluvial clay	9.50-18.50		90431602 (bulk), 90431603 (lower laminated sand)	
90431607	Mid yellowish brown sandy clay with brown sand laminations.	Alluvial clay	18.50-19.00		90431604	
90431608	Coarse yellowish brown gravelly sand. Frequent sub-rounded flint clasts (10-90mm, occasionally up to 120mm).	Fluvial sands and gravels	19.00 - 20.00		-	
90431609	Chalk.	Chalk bedrock	20.00-22.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04317	
Coordinates (NGR) X: 567936.47		Coordinates (NGR) Y: 173430.41		Level (top): 2.22	
Length: -		Width: -		Depth: 40 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90431701	Mid brown clayish silt. Occasional sub-rounded flint clasts (10-60mm). Rooted.	Topsoil	0.00-0.30		-
90431702	Mid brown silty clay with occasional sub-rounded flint clasts (10-60mm).	Subsoil	0.30-0.65		-
90431703	Fine blueish grey clay with brown mottling in upper 1m. Becomes very soft and drilling method disturbs much of the structure. May be laminated. Becoming slightly stiffer at 6.00m and includes moderately frequent flint clasts (20-70mm).	Alluvial clay	0.65-7.10		90431701
90431704	Firm greyish green very slightly sandy clay with moderately frequent rounded chalk clasts (<50mm) and moderately frequent fine shell fragments (5-10mm).	Alluvial clay with ?colluvial component	7.10-13.00		90431702 (UT100 shoe) 90431703 (bulk disturbed)
90431705	Fine mid to dark grey clean clay with occasional gypsum clasts (<5mm).	Alluvial clay	13.00-16.20		90431704 (bulk disturbed) 90431705 (UT100 shoe)
90431706	Fine grey clayey sand. Clast free.	Fluvial sand	16.20-18.20		-
90431707	Fine pale grey sandy clay. Clast free.	Fine clay lens above fluvial sand and gravel	18.20-18.30		-
90431708	Fine to medium sub-angular and sub-rounded flint gravel (50-120.m) with rounded chalk clasts (5-10mm) in mid grey coarse sand matrix.	Fluvial sand and gravel	18.30-20.00		-
90431709	White chalk with sub-angular flint clasts (0.50-1.20cm) upper 0.5m includes fine sub-rounded fine flint clasts (5mm).	Soliflucted chalk grading into chalk bedrock	20.00-25.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04318	
Coordinates (NGR) X: 568048.51		Coordinates (NGR) Y: 173438.99		Level (top): 2.02	
Length:		Width:		Depth: 10 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90431801	Mid brown friable to firm silty clay. Very occasional fine to medium sub-rounded flint clasts (<50mm)	Topsoil	0.00-0.30		-
90431802	Firm mid grey slightly sandy clay with mid brown organic mottling.	Alluvial clay	0.30-1.30		-
90431803	Firm to soft mid grey slightly sandy clay.	Alluvial clay	1.30-1.50+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04319	
Coordinates (NGR) X: 567974.00		Coordinates (NGR) Y: 173522.11		Level (top): 1.96	
Length: -		Width: -		Depth: 15 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		-
90431901	Dark greenish grey silty clay. <1% peaty inclusions. Clast free. Poorly consolidated.	Alluvial clay	1.20-3.00		-
90431902	Dark greenish grey silty clay. <1% peaty inclusions. Clast free. Poorly consolidated. 6.00: peaty inclusions becoming more frequent. Diffuse contact.	Alluvial clay	3.15-7.60		-
90431903	Mid-light greyish green very fine sandy silty clay. Clast free. Moderately consolidated. Diffuse contact.	Alluvial clay	7.60-9.10		-
90431904	Mid-light greyish green and greenish blue mottled silty clay. Clast free. Moderately consolidated, becoming well consolidated with depth. 12.20: <5% Fe staining 13.50: becoming waterlogged	Alluvial clay	9.10-15:00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04320	
Coordinates (NGR) X: 568002.63		Coordinates (NGR) Y: 173555.59		Level (top): 1.99	
Length: -		Width:-		Depth: 50 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90432001	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		-
90432002	Soft dark grey silty clay. Common pockets (50mm) of mid to dark brown organic material. Diffuse contact. Core loss between 1.50 and 1.60m.	Alluvial clay	1.20-2.50		-
90432003	Soft mid grey mottled light brownish grey silty clay. Frequent pockets of dark brown fibrous organic material. Abrupt contact.	Alluvial clay	2.50-3.65		-
90432004	Soft very dark brown to black highly compressible fibrous material. Abrupt contact.	Peat	3.65-3.88		-
90432005	Mid to dark grey soft silty clay. Occasional fragments of dark brown fibrous organic matter. Sharp contact. Core loss between 4.50-5.06m	Alluvial clay	3.88-4.50		-
90432006	Soft dark grey silty clay. Very occasional small fragments of fibrous organic material. Abrupt contact.	Alluvial clay	5.06-7.05		-
90432007	Very dark grey firm slightly sandy silty clay. Sand is fine. Laminated. Common fibrous organic material. Sharp contact.	Alluvial clay	7.05-7.20		-
90432008	Black highly compressible fibrous material. Rare pockets of mid grey soft silty clay. Sharp contact.	Peat	7.20-7.60		-
90432009	Firm dark grey very slightly gravelly silty clay. Rare pockets of dark brown fibrous organic material. Gravels are very rare sub-angular to rounded flint clasts (<9mm). Flint is well sorted and only found within last 0.20m of the unit. Abrupt contact.	Alluvial clay	7.60-8.37		-

90432010	Firm mid brownish grey occasionally mottled mid orange grey sandy gravelly clay. Sand is fine to coarse. Gravel is frequent fine sub-angular to rounded flint clasts (<20mm) and occasional sub-rounded to rounded flint clasts (<90mm). Band of dark grey slightly sandy gravelly clay from 9.00-9.10m.	Alluvial clay	8.37-9.65		-
90432011	Firm to stiff mid orangish mottled grey brown slightly gravelly clay. Very rare fine flint gravel. Laminated. Diffuse contact.	Alluvial clay	9.65-13.15		-
90432012	Stiff mid grey clay. Occasional pockets of dark brown clay. Laminated. Diffuse contact.	Alluvial clay	13.15-14.70		-
90432013	Stiff dark grey clay. Rare pockets of dark orange brown fine to coarse sand. Abrupt contact.	Alluvial clay	14.70-16.40		-
90432014	Very dark grey slightly gravelly sandy clay. Sand is fine to medium. Gravel is frequent sub-angular to rounded flint clasts (<100mm). Abrupt contact.	Fluvial clay	16.40-17.32		-
90432015	Mid orangish brown sandy gravel. Sand is fine to coarse. Gravel sub-angular to rounded flint (100mm). Loose. Abrupt contact. Core loss from 18.00-18.16m.	Fluvial sand and gravel	17.32-18.65		-
90432016	Dark orangish brown gravelly sand. Sand is fine to coarse. Gravel is very frequent sub-angular to rounded flint clasts (<100mm). Loose. Abrupt contact. Core loss from 19.50-19.60 m,	Fluvial sand and gravel	18.65-19.60		-
90432017	Mid brown degraded chalk.	Chalk. Upper part brecciated and potentially soliflucted	19.60+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04321	
Coordinates (NGR) X: 567895.00		Coordinates (NGR) Y: 173570.08		Level (top): 2.08	
Length: -		Width: -		Depth: 50 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		-
90432101	Mid bluish grey silty clay. <10% Fe flecks. Frequent organic peaty inclusions. Occasional rootlets. Well consolidated.	Alluvial clay	1.20-3.00		-
90432102	Dark brownish black pseudo fibrous peat. Clast free. Soft. Sharp contact.	Peat	4.50-4.57		-
90432103	Mid-dark bluish grey silty clay. Frequent small peaty inclusions. Well consolidated. Soft. Sharp contact.	Alluvial clay	4.57-6.50		-
90432104	Dark reddish brown silty organic clay. Clast free. Finely laminated. Poorly consolidated. Abrupt contact.	Organic alluvial clay	6.50-6.75		-
90432105	Mid-dark greyish brown silty clay. Clast free. Finely laminated. Sharp contact.	Alluvial clay	6.75-6.95		-
90432106	Dark blackish brown pseudo fibrous peat. Clast free. Laminated. Moderately consolidated. Sharp contact.	Organic alluvial clay	6.95-7.10		-
90432107	Mid-light bluish grey silty clay. <10% fine peaty inclusions. Coarsely laminated. Moderately consolidated. Diffuse contact.	Alluvial clay	7.10-8.20		-
90432108	Light yellowish grey clayey medium sand. <10% fine to coarse (10-70mm) sub-angular and angular flint clasts; poorly sorted. <30% rounded chalk flecks. Structureless. Moderately consolidated. Abrupt contact.	Alluvial sand	8.20-9.60		-
90432109	Mid-light greenish blue silty clay with yellowish red Fe mottling. Clast free. Moderately consolidated. Structureless. Diffuse contact	Alluvial clay	9.60-14.60		-
90432110	Mid-dark bluish grey very fine sandy silty clay. <1% gypsum (?) flecks. Rare organics. Well consolidated. Becoming darker and sandier with depth Sharp contact	Alluvial clay	14.60-16.95		-

90432111	Fine to coarse (10-60mm) rounded, sub-rounded and sub-angular flint and chert gravels in a dark brownish red coarse sand matrix. Clast supported. Moderate to well sorted. Poorly consolidated.	Fluvial gravel	16.95-17.70		-
90432112	Mid reddish brown gravelly coarse sand. <20% fine to medium (5-20mm) sub-angular, sub-rounded and rounded flint clasts. Well sorted. Poorly consolidated. Sharp contact.	Fluvial sand	18.00-18.40		-
90432113	Fine to coarse (10-60mm) rounded, sub-rounded and sub-angular flint gravel in a dark brownish red coarse sand matrix. Clast supported. Moderately to well sorted. Poorly consolidated. Sharp contact	Fluvial gravel	18.40-19.60		-
90432114	Light greyish red coarse gravelly sand. <5% fine (5-10mm) sub-rounded and sub-angular flint clasts. Well sorted. Poorly consolidated. Sharp contact	Fluvial sand	19.60-19.75		-
90432115	Fine to very coarse (20-110mm) sub-angular and sub-rounded flint gravels in a light greyish red very coarse sand matrix. Well sorted. Poorly consolidated. Sharp contact.	Fluvial gravel	19.75-20.20		-
90432116	Chalk.	Bedrock chalk	20.20-21.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04322	
Coordinates (NGR) X: 567958.10		Coordinates (NGR) Y: 173604.66		Level (top): 1.96	
Length: -		Width: -		Depth: 15 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90432201	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		-
90432202	Soft light to mid grey silty clay. Occasional pockets of dark brown organic matter. Pockets of reddish brown clay. Occasional sub-rounded to rounded chalk <20mm. Diffuse contact. Core loss between 1.50-1.80m.	Alluvial clay	1.20-2.75		-
90432203	Soft dark grey brown silty clay. Frequent dark brown to black fibrous material (possible peat). Diffuse contact.	Alluvial clay	2.75-3.10		-
90432204	Light to mid grey soft silty clay. Sparse pockets of fibrous organic matter. Abrupt contact.	Alluvial clay	3.10-4.50		-
90432205	Soft black organic fibrous material. Sharp contact.	Peat	4.50-4.60		-
90432206	Soft mid grey silty clay. Common black organic fibrous material. Extremely finely laminated. Abrupt contact	Alluvial clay	4.60-7.16		-
90432207	Firm very dark brown slightly sandy silty clay. Sand is fine. Abundant compressible fibrous organic material. Sharp contact.	Peat	7.16-7.50		-
90432208	Soft mid grey silty clay. Frequent flecks of dark brown to black fibrous organic material. Diffuse contact.	Alluvial clay	7.50-8.36		-
90432209	Very dark brown to black highly compressible fibrous organic material. Diffuse contact.	Peat	8.36-8.47		-
90432210	Dark grey soft silty clay. Very rare coarse sand. Moderately frequent small fragments of dark brown and black organic material. Abrupt contact. Core loss between 9.00-9.70m.	Alluvial clay	8.47-9.80		-

90432211	Soft light grey with rare brownish mottling slightly gravelly clay. Gravel is sparse sub-angular to rounded flint clasts <60mm. Diffuse contact. Core loss between 10.50-11.15m.	Fluvial clay	9.80-11.40		-
90432212	Soft mid brown mottled orangish brown slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is moderate sub-rounded to rounded flint clasts (<80mm). Diffuse contact	Fluvial clay	11.40-11.78		-
90432213	Firm very dark orangish brown slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is rare sub-rounded to rounded flint clasts (<60mm). Abrupt contact.	Fluvial clay	11.78-12.00		-
90432214	Dark greyish brown mottled light grey firm becoming stiff clay. Rare pockets of dark reddish brown silty clay. Very rare very fine sub-rounded to rounded flint clasts (<10mm).	Fluvial clay	12.00-15.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04323	
Coordinates (NGR) X: 567908.45		Coordinates (NGR) Y: 173612.20		Level (top): 2.02	
Length: -		Width: -		Depth: 25 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90432301	Mid brown friable to firm sandy silt. Rooted. Diffuse contact.	Topsoil	0.00- 0.30		-
90432302	Mid greyish brown sandy clay with some light reddish brown mottling. Sharp contact.	Subsoil	0.30- 1.00		-
90432303	Mid grey firm to soft grey clay with thin bands of peat and traces of organics within clay matrix. Slight bluish hue in places.	Alluvial clay	1.00- 6.00		90432301
90432304	Mid bluish grey clay silt (fine grained) with rare fine decayed organic vegetation. Could be the same as 90432303.	Alluvial silt	6.00- 7.20		90432302
90432305	Mid bluish grey clay (firm) with peat lenses which include large vegetation fragments.	Alluvial clay	7.20- 9.00		90432303
90432306	Pale grey fine grained sandy clay (firm to loose) with occasional angular and sub- rounded flint gravels (<0.08).	?Colluvial/alluvia l sand	9.00 - 9.50		90432304
90432307	Pale grey fine grained sandy clay (firm) with abundant angular and sub-rounded flint clasts and very rare chalk flecks.	?Colluvial/fluvia l sand and gravel	9.50- 10.60		-
90432308	Mid to pale greyish brown clay (firm to compact) with occasional sub-rounded and sub-angular flint flecks (<10mm). Becomes bluer with depth with mid brown (manganese?) lenses.	Alluvial clay	10.60- 15.50		-
90432309	Mixed mid brown and mid greyish blue coarse grained sandy clay (firm to soft) with abundant rounded to sub-angular flint gravels (<0.20). Becomes brown and sandy with depth.	Fluvial sand and gravel	15.50- 19.80		-
90432310	Chalk marl with occasional sub-angular to rounded flints (<150mm). becoming structural soon after interface.	Soliflucted/ brecciated chalk becoming chalk bedrock	19.80- 21.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04324	
Coordinates (NGR) X: 568000.08		Coordinates (NGR) Y: 173607.85		Level (top): 2.02	
Length: -		Width: -		Depth: 20 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90432401	Mid brown silty clay (compact and dry) with moderate rooting. Occasional sub-angular to sub-rounded flint clasts (<4mm). Abrupt contact.	Topsoil	0.00-0.16		-
90432402	Mid greyish brown clay silt (compact) with thin oxidised bands. Abrupt contact	Subsoil	0.16-0.95		-
90432403	Mid to pale bluish grey clay (firm to soft) with mid brown clay lenses. Diffuse contact	Alluvial	0.95-1.60		-
90432404	Dark bluish grey clay (soft) with isolated pockets of peat/decayed vegetation. Diffuse contact.	Alluvial clay	1.60-2.50		-
90432405	Dark greenish bluish grey clay (soft) with abundant decayed fine rooting and organic matter. Diffuse contact	Alluvial clay	2.50 - 3.50		90432401
90432406	Pale bluish grey clay (soft) with very occasional organic components and shells. Diffuse contact.	Alluvial clay	3.50-5.00		90432402
90432407	Decayed organic matter in a dark bluish grey clay (soft) matrix. Diffuse contact.	Alluvial clay	5.00-5.50		90432403
90432408	Pale bluish grey clay (soft) with very occasional organic components. Diffuse contact.	Alluvial clay	5.50-7.00		-
90432409	Pale to mid grey clay silt (soft to firm) with very occasional pockets/lenses of decayed organic material. Abrupt contact.	Alluvial silt	7.00-7.50		-
90432410	Pale to mid grey clay with blue hue (very soft). Frequent compacted bands of compressed decayed organic material. Abrupt contact.	Alluvial clay	7.50-7.80		90432404
90432411	Mid grey clay (soft) with flecks of decayed organic material.	Alluvial clay	7.80-9.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04325		
Coordinates (NGR) X: 567922.95		Coordinates (NGR) Y: 173682.88		Level (top): 2.01		
Length: -		Width: -		Depth: 50 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
90432501	Dark brown silty clay loam, blocky granular structure. Diffuse contact.	Topsoil	0.00- 0.20		-	
90432502	Stiff grey brown silty clay. Abundant Fe mottling. Blocky structure. Occasional small organic patches.	Alluvial clay	0.20- 1.20		-	
90432503	Firm grey silty clay with frequent small organic patches (phragmites remains).	Alluvial clay	1.20- 2.50+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04326	
Coordinates (NGR) X: 567984.60		Coordinates (NGR) Y: 173738.05		Level (top): 2.10	
Length: -		Width: -		Depth: 25 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90432601	Dark brown silty clay loam, blocky granular structure. Diffuse contact.	Topsoil	0.00- 0.20		-
90432602	Stiff Fe mottled grey brown silty clay.	Alluvial clay	0.20- 1.20		-
90432603	Soft/firm dark grey silty clay becoming blue grey with depth. Occasional small organic patches (phragmites).	Alluvial clay	1.20- 4.10		-
90432604	Very dark brown fibrous peat, abundant phragmites remains.	Fen peat/stabilization horizon	4.10- 4.30		90432601
90432605	Firm blue grey silty clay with common organic patches (phragmites).	Alluvial clay	4.30- 8.10		-
90432606	Very dark brown organic clay.	Organic alluvial clay	8.10- 8.20		90432602
90432607	Firm blue grey silty clay with common organic patches (phragmites).	Alluvial clay	8.20- 10.50		-
90432608	Mid to light grey slightly silty clay with moderately frequent rounded and sub-rounded flint clasts (5-15mm) and moderate shell fragments (<5mm).	Alluvial clay	10.50- 11.00		90432603
90432609	Pale blueish grey stiff silty clay with very occasional fine sub-angular flint clasts (<5mm).	Alluvial clay	11.00- 12.10		90432604
90432610	Sub-angular and sub-rounded fine flint gravel (5-75 mm) in coarse sand and shell matrix.	Alluvial gravel	12.10- 12.90		-
90432611	Pale blueish grey stiff silty clay with mid brown mottling. Occasional patches of sub-rounded flint gravel (5-15mm) and occasional flint clasts (<50mm). Becomes sandier with depth.	Alluvial clay	12.90- 14.00		90432605
90432612	Sub-angular fine flint gravel (30-90mm) with very occasional larger flint clasts (70-110mm). Coarse sand and grit matrix. Basal part consists of medium to coarse flint gravel (<150mm).	Fluvial sand and gravel	14.00- 19.90		-
90432613	Chalk.	Chalk bedrock	19.9- 21.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04327	
Coordinates (NGR) X: 567948.20		Coordinates (NGR) Y: 173711.21		Level (top): 2.15	
Length: -		Width: -		Depth: 15 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90432715	Dark grey brown silty clay loam, blocky/granular structure. Diffuse contact.	Topsoil	0.00-0.20		-
90432716	Stiff grey brown silty clay, abundant Fe mottling, blocky structure, occasional small organic patches.	Alluvial clay	0.20-1.50		-
90432701	Mid-dark greenish grey clay. With common fibrous peat inclusions. Moderately consolidated. Structureless. Sharp contact.	Alluvial clay	1.50-4.50		-
90432702	Dark greyish black fibrous peat with patches of mid greenish grey alluvial clay. Structureless. Poorly consolidated. Sharp contact.	Peat	4.50-4.80		90432701
90432703	Dark greenish grey clay with common fibrous peat inclusions. Sharp contact.	Alluvial clay	4.80-7.40		-
90432704	Dark greyish brown silt organic clay. Possibly laminated. Poorly consolidated. Sharp contact.	Alluvial clay	7.40-8.00		90432702
90432705	Dark greenish grey silty clay with common fibrous peat inclusions and rare chalk flecks. Structureless. Moderately consolidated. Sharp contact.	Alluvial clay	8.00-9.20		-
90432706	Dark brown fibrous peat. clast free. Structureless. Poorly consolidated. Sharp contact.	Peat	9.20-9.40		90432703
90432707	Dark greyish brown silty clay with occasional peaty inclusions. Structureless. Moderately consolidated. Abrupt contact.	Alluvial clay	9.40-10.00		-
90432708	Light reddish grey fine sandy gravelly clay. <10% fine to medium (5-20mm) sub-angular, sub-rounded and rounded flint clasts; poorly sorted. Structureless. Moderately consolidated. Abrupt contact	Alluvial clay	10.00-11.00		-
90432709	Mid greyish green silty clay. <5% chalk flecks. 1% fine rounded flint clast (3-5mm). Structureless. Well consolidated. Abrupt contact	Alluvial clay	11.00-11.50		-

90432710	Mid brownish grey medium gravelly sandy clay. <5% fine to coarse (5-50mm) angular, sub-rounded and sub-angular flint clasts; poorly sorted. Structureless. Moderately consolidated.	Alluvial clay	11.50-12.00		-
90432711	Mid greenish grey fine sandy clay. <1% fine (5-10) sub-rounded and sub-angular flint clasts. <1% chalk flecks. Structureless. Moderately consolidated. Structureless. Diffuse contact.	Alluvial clay	12.60-13.20		-
90432712	Mid greyish green clay. <1% chalk flecks. Structureless. Well consolidated.	Alluvial clay	13.20-13.50		-
90432713	Mid reddish grey coarse sandy gravelly clay. <5% fine to medium (3-10mm) sub-rounded and sub-angular flint and clasts; poorly sorted. Structureless. Poorly consolidated. Sharp contact	Alluvial clay	13.75-14.60		-
90432714	Fine to coarse (5-20mm) angular, sub angular and sub-rounded gravel in a reddish brown coarse sand matrix. Moderately sorted. Structureless. Poorly consolidated.	Fluvial gravel	14.60-16.00		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04329	
Coordinates (NGR) X: 567971.84		Coordinates (NGR) Y: 173790.45		Level (top): 2.10	
Length: -		Width: -		Depth: 21 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		-
90432901	Mid bluish brown silty clay. <5% Fe flecks. <5% medium peaty inclusions. Moderately consolidated.	Holocene alluvium	1.20-1.50		-
90432902	Mid-dark bluish grey silty clay. <5% medium peaty inclusions. Poorly consolidated. Diffuse contact.	Alluvial clay	2.30-3.85		-
90432903	Mid-dark greyish green silty clay. <20% peat inclusions. Moderately consolidated. Sharp contact.	Alluvial clay	3.85-4.30		-
90432904	Dark brownish black pseudo fibrous peat; no apparent inclusions. Crumbly; poorly consolidated. Sharp contact.	Peat	4.30-4.50		-
90432905	Mid greyish green silty clay. Occasional roots. Clast free. Moderately consolidated. Sharp contact.	Alluvial clay	4.50-7.70		-
90432906	Mid greyish brown fine sandy silty clay. Clast free. Laminated. Sharp contact.	Alluvial clay	7.70-7.90		-
90432907	Dark brownish black fibrous peat. Clast free. Poorly consolidated. Sharp contact.	Peat	7.90-8.00		-
90432908	Mid-dark greenish grey silty clay. Frequent peaty inclusions. Occasional rootlets. Moderately consolidated. Abrupt contact.	Alluvial clay	8.00-10.30		-
90432909	Light greyish green silty clay. Clast free. Moderately consolidated. Abrupt contact	Alluvial clay	10.30-10.65		-
90432910	Mid greenish brown silty gravelly medium sand; <30% fine to medium (5-20mm) rounded and sub-rounded flint clasts; moderately sorted. <10% rounded chalk flecks. <5% possible shell fragments. Sharp contact.	Alluvial sand	10.65-11.20		-
90432911	Light bluish green silty clay. Clast free. Well consolidated. Sharp contact.	Alluvial clay	11.20-11.80		-

90432912	Mid greenish brown gravelly clayey medium sand. <10% fine (5-20mm) rounded and sub-rounded flint clasts; moderately sorted. <10% rounded chalk flecks. <5% possible shell fragments. Poorly consolidated. Sharp contact.	Alluvial sand	11.80-12.30		-
90432913	Mid-light bluish green silty clay. Clast free. Well consolidated. Diffuse contact.	Alluvial clay	12.30-12.60		-
90432914	Mid-dark greenish brown clayey medium sand. 1% fine to medium sub-rounded and sub-angular flint clasts; poorly sorted. <5% chalk/shell(?) flecks. Sharp contact.	Alluvial sand	12.60-13.00		-
90432915	Mid-dark brownish green silty clay. Clast free. Well consolidated. Becoming darker with depth. Diffuse contact.	Alluvial clay	13.00-13.60		-
90432916	Dark brownish grey medium sandy clay. Clast free. Well consolidated. Abrupt contact.	Alluvial clay	13.60-13.90		-
90432917	Mid-light greenish brown fine sandy clay. <1% fine to coarse (10-40mm) rounded, sub-rounded and sub-angular flint clasts; poorly sorted. Moderately consolidated. Sharp contact.	Alluvial clay	13.90-14.20		-
90432918	Fine to coarse rounded, sub-rounded and sub-angular flint/chert gravels in a mid-brownish red clayey coarse sand matrix. Poorly sorted. Poorly consolidated. Becoming coarser with depth. Core loss at 18.00-18.40m.	Fluvial gravel	14.20-18.00		-
90432919	Light reddish brown gravelly coarse sand. <10% fine to coarse (5-70mm) rounded, sub-rounded and sub-angular flint clasts. Becoming gravellier with depth. Moderately sorted. Poorly consolidated. Sharp contact.	Fluvial sands	18.40-20.50		-
90432920	Chalk.	Chalk bedrock	20.50-21.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04330		
Coordinates (NGR) X: 567897.23		Coordinates (NGR) Y: 173741.18		Level (top): 2.04		
Length: -		Width: -		Depth: 50 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
90433001	Mid greyish brown silty clay loose and dry with moderate to frequent rooting. Diffuse contact	Topsoil	0.00- 0.08		-	
90433002	Mid grey clay (compact). Clast free. Abrupt contact.	Subsoil	0.08- 1.00		-	
90433003	Mid bluish grey clay (soft). Clast free.	Alluvial	1.00 - 2.10		-	
90433004	Dark bluish grey clay silt (soft to firm) with thin bands of organic material and occasional organic inclusions. 3.50 to 4.50m thicker band of organic material.	Alluvial silt	2.10- 7.25		90433001	
90433005	Mid bluish grey clay silt (firm to soft).	Alluvial silt	7.25- 8.90		-	
90433006	Mid to dark brown peat (firm) with fibrous rootlets.	Peat	8.90- 9.00		-	
90433007	Mid bluish grey clay silt sand (firm) with thin lenses of decayed organic material in upper part of unit.	Alluvial sand	9.00- 10.80		90433002	
90433008	Light to mid bluish grey clay silt (firm to compact) with very occasional to occasional flint flecks. Occasional flint clasts (<10mm). Lenses of fine grained pale grey sand.	Alluvial silt	10.80- 11.60		-	
90433009	Pale greyish brown fine sand (compact) with occasional sub-angular to sub-rounded flint clasts (<60mm).	Alluvial sand	11.60- 12.00		90433003	
90433010	Pale bluish grey clay (compact) with thin lenses of calcareous silt.	Alluvial clay	12.00- 13.10		-	
90433011	Pale bluish grey clay (compact) with thin lenses of organic material.	Alluvial clay	13.10- 14.00		-	
90433012	Mid brown coarse sand (soft) with small flecks of flint.	Fluvial sand	14.00 - 15.00		90433004	
90433013	Abundant to near complete sub-angular to sub-rounded flint gravel (<70mm). Size of flint clasts increases up to nodule size (<0.20) with depth.	Fluvial sand and gravel	15.00 - 19.80		-	
90433014	Sub-rounded to angular chalk nodules (<150mm) with sparse sub-rounded to sub-angular flint nodules (<200mm).	Chalk bedrock, upper part brecciated and/or soliflucted	19.80- 21.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04331	
Coordinates (NGR) X: 567890.56		Coordinates (NGR) Y: 173795.21		Level (top): 2.15	
Length: -		Width: -		Depth: 50 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90433101	Mid brown friable to firm silty clay. Rooted.	Topsoil	0.00-0.30		-
90433102	Firm to hard brownish grey sandy clay.	Subsoil	0.30-0.90		-
90433103	Soft mid grey clay. Generally, clast free.	Alluvial clay	0.90-1.80		-
90433104	Soft pseudo fibrous brown peat.	Peat	1.80-2.00		90443101
90433105	Soft becoming firm mid bluish grey fine silty clay. Clast free.	Alluvial clay	2.00-7.80		-
90433106	Soft to firm mid brown pseudo fibrous peat within a grey silty clay matrix.	Organic alluvial clay	7.80-8.00		90433102
90433107	Soft becoming firm mid bluish grey fine sandy clay. Generally, clast free. Layer of organic fibres at very base.	Holocene alluvium	8.00-11.20		-
90433108	Mid grey fine sand with occasional fine flint clasts (<20mm).	Alluvial sand	11.20-11.50		-
90433109	Mid bluish grey firm fine clay. Upper part includes moderate sub rounded white chalk fragments (<10mm). 13.85: Laminated unit with narrow (50mm) bands of dark grey fine sand within it (sample 90433103)	Alluvial clay	11.50-15.20		90433103
90433110	Sub-angular and sub-rounded flint gravel (30-90mm, with occasional clasts up to 130mm) within a mid-yellowish brown coarse sand matrix.	Fluvial sand and gravel	15.20-20.00		-
90433111	White chalk.	Chalk bedrock	20.00-22.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04332	
Coordinates (NGR) X: 567931.399		Coordinates (NGR) Y: 173815.81		Level (top): 2.28	
Length: -		Width: -		Depth: 15 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	0.00-1.20: Hand dug trial pit.	Hand dug trial pit			-
90433201	Mid brownish grey silty clay with occasional Fe staining. Clast free. Moderately consolidated. 7.00m contains organic frags; becoming more frequent with depth. Sharp contact.	Alluvial clay	1.20-8.70		-
90433202	Dark greyish brown organic clayey silt. Clast free. Poorly consolidated Diffuse contact.	Organic alluvial silt	8.70-8.90		-
90433203	Dark blackish brown non fibrous peat. Clast free. Poorly consolidated.	Peat	8.90-9.00		-
90433204	Mid greyish green silty clay. Occasional organic fragments (rootlets?). Clast free. Moderately consolidated. Diffuse contact.	Alluvial clay	9.00-10.80		-
90433205	Light greenish grey gravelly medium sandy clay. <10% fine to coarse (5-70mm) angular, sub-angular and sub-rounded flint clasts; poorly sorted. <1% rounded chalk flecks. <1% possible fine shell fragments. 11.80-12.00: core loss.	Alluvial clay	10.80-11.80		-
90433206	Light greyish green silty clay. clast free. Well consolidated. Sharp contact.	Alluvial clay	12.00-12.55		-
90433207	Light brownish green clayey medium sand. <1% chalk flecks? <1% fine flint inclusions. Poorly consolidated. Sharp contact.	Fluvial sand?	12.55-12.80		-
90433208	Light brownish green clay. Clast free. Very well consolidated.	Alluvial clay	12.80-13.80		-
90433209	Mid greyish green medium sandy clay. <1% fine sub-angular flint clasts. Becoming sandier with depth Sharp contact.	Alluvial clay	13.80-14.70		-
90433210	Fine to medium (5-15mm) rounded, sub-rounded and sub-angular flint gravel in a mid-reddish brown coarse sand matrix. Moderately sorted. Poorly consolidated.	Fluvial gravel	14.70-15.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04333	
Coordinates (NGR) X: 567972.55		Coordinates (NGR) Y: 173850.32		Level (top): 2.32	
Length: -		Width: -		Depth: 50 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90433301	Firm to friable mid brown silty clay. Rooted.	Topsoil	0.00-0.40		-
90433302	Firm mid brownish grey sandy clay with mid brown mottling.	Alluvial clay	0.40-1.70		-
90433303	Soft mid to dark grey clay. Clast free. Becomes very soft.	Alluvial clay	1.70-2.50		-
90433304	Firm brown pseudo fibrous peat band with a grey clay matrix.	Organic alluvial clay	2.50-2.80		90433301
90433305	Soft mid to dark grey clay. Clast free. Becomes very soft.	Alluvial clay	2.80-7.50		-
90433306	Firm brown pseudo fibrous peat band with a grey clay matrix.	Organic alluvial clay	7.50-7.80		90433302
90433307	Soft mid to dark grey clay. Clast free. Occasional patches of brown peat.	Alluvial clay	7.80-11.30		-
90433308	Mid grey firm fine sand with occasional flint clasts (40-60mm)	Alluvial sand	11.30-12.70		90433303
90433309	Mid to pale bluish grey firm to stiff clay with shell fragments (<10mm) and occasional fine sub-rounded flint clasts (<10mm).	Alluvial clay	12.70-14.10		90433304
90433310	Firm mid greenish grey fine sand with occasional coarse pockets. Transition from grey clay above is diffuse with upper part of layer grey and a bit clayey. Gravel below is sharp transition.	Alluvial sand	14.10-15.50		90433305
90433311	Compact sub-rounded fine to medium flint gravel (10-80mm) with occasional larger clasts <110mm). Matrix of yellowish brown coarse sand.	Fluvial sand and gravel	15.50-20.30		-
90433312	Chalk.	Chalk bedrock	20.30-22.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH04334	
Coordinates (NGR) X: 567921.63		Coordinates (NGR) Y: 173855.51		Level (top): 2.22	
Length: -		Width: -		Depth: 15 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90433401	0.00-1.20: Hand dug trial pit. Mid brownish grey silty clay with frequent Fe staining. Occasional rootlets. Occasional peaty inclusions. Moderately consolidated. Sharp contact.	Alluvial clay	1.20-5.10		-
90433402	Dark brownish black fibrous peat. Clast free. Poorly consolidated. Sharp contact.	Peat	5.10-5.20		-
90433403	Mid brownish grey silty clay with frequent Fe staining. Occasional rootlets. Occasional peaty inclusions; Moderately consolidated. Sharp contact.	Alluvial clay	5.20-7.40		-
90433404	Mid-dark reddish brown organic silty clay. Clast free. Finely laminated. Diffuse contact.	Organic alluvial clay	7.40-7.65		-
90433405	Dark greyish brown organic silty clay. Clast free. Laminated. Poorly consolidated. Sharp contact.	Alluvial clay	7.65-7.85		-
90433406	Dark brownish black pseudo fibrous peat. Clast free. Poorly consolidated. Sharp contact.	Peat	7.85-7.95		-
90433407	Mid greenish grey silty clay. Occasional peaty inclusions. Moderately consolidated. Sharp contact.	Alluvial clay	7.95-11.10		-
90433408	Dark black pseudo fibrous peat. Clast free. Poorly consolidated. Sharp contact.	Peat	11.10-11.35		-
90433409	Light greenish grey gravelly clayey fine sand. <5% fine to medium (5-15mm) rounded and sub-rounded flint clasts. Well sorted. Abrupt contact.	Alluvial sand	11.35-11.65		-
90433410	Light bluish green very fine sandy silty clay. Clast free. Moderately consolidated. 13.50-13.70: Core loss.	Alluvial clay	11.65-13.50		-

90433411	Light bluish grey silty clay. <1% medium (10-15mm) flint clasts. Moderately sorted. Becoming gravellier with depth. Moderately consolidated. Sharp contact.	?Alluvial clay	13.70-14.85		-
90433412	Fine to medium (5-15mm) rounded and sub-rounded gravel in reddish brown coarse sand matrix. Moderately to well sorted. Poorly consolidated.	Fluvial gravel	14.85-15.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH05304	
Coordinates (NGR) X: 567873.65		Coordinates (NGR) Y: 174293.44		Level (top): 2.07	
Length: -		Width: -		Depth: 25 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90530401	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		-
90530402	Dark grey brown very slightly sandy silty clay. Occasional partings of dark reddish brown silty clay. Sand is fine. Diffuse contact.	Alluvial clay	1.20-1.83		-
90530403	Soft mid brown grey silty clay. Occasional partings of dark reddish brown silty clay. Very occasional fine fragments of black organic material. Diffuse contact.	Alluvial clay	1.83-2.40		-
90530404	Soft mid tending to dark grey silty clay. Occasional dark brown to black fragments of fibrous organic matter (peat/roots). Diffuse contact.	Alluvial clay	2.40-3.80		-
90530405	Soft mid grey silty clay. No obvious inclusions. From 6.00 m onwards there are rare pockets and fragments of dark brown to black fibrous organic material. At around 7.10 m the logging engineer had marked around 0.05 m as shelly. Abrupt contact.	Alluvial clay	3.80-7.35		-
90530406	Very dark brown to black amorphous spongy highly compressible fibrous organic material. Occasional pockets of mid grey clay. Laminated. Very rare fine sand or very small shells. Sharp contact.	Peat band within alluvial clay	7.35-7.80		-
90530407	Soft mid grey silty clay. Frequent flecks and fragments of dark brown to black fibrous organic material, throughout. Abrupt contact.	Alluvial clay	7.80-9.75		-
90530408	Spongy amorphous black fibrous organic material. Occasional laminations. Sharp contact.	Peat	9.75-9.85		-
90530409	Soft very dark grey silty clay common pockets of black fibrous organic material. Diffuse contact.	Alluvial clay	9.85-10.30		-
90530410	Firm light grey rarely mottled brown very slightly gravelly clay. Gravel is very rare sub-rounded to rounded flint clasts (<10m). Occasional fragments of black organic material. 10.50-10.60m band of fine sandy clay. Diffuse contact.	Alluvial clay	10.30-12.35		-

90530411	Very dark grey mottled orangish brown and black clayey sand. Sand is fine to medium. Abrupt contact.	Alluvial sand	12.35-12.55		-
90530412	Dark greyish brown mottled orangish brown fine to coarse sand. Extremely occasional fine rounded flint gravels. Diffuse contact. Core loss from 13.40-13.75m.	Alluvial sand	12.55-14.15		-
90530413	Mid orangish brown slightly gravelly clayey sand. Sand is fine to coarse. Gravel is occasional sub-angular to rounded flint clasts <0.10 m. Abrupt contact.	Fluvial sand and gravel	14.15-14.80		-
90530414	Fine to medium flint gravel. Abrupt contact.	Fluvial sand and gravel	14.80-15.15		-
90530415	Fine to coarse flint gravel (<100mm). Clasts are angular to rounded.	Fluvial sand and gravel	15.15-15.50		-
90530416	Angular to rounded fine to medium flint in orange brown sand matrix. Sand is fine to coarse. Abrupt contact.	Fluvial sand and gravel	15.50-15.73		-
90530417	Fine to coarse angular to rounded flint gravel. Sharp contact. Core loss from 15.95-16.50m.	Fluvial sand and gravel	15.73-15.95		-
90530418	Fine to medium angular to rounded flint gravel in dark orangish brown mottled grey brown and blue sand matrix. Sand is fine to coarse. Abrupt contact.	Fluvial sand and gravel	16.50-16.70		-
90530419	Angular to rounded fine to coarse flint gravel in orangish brown sand matrix. Sand is fine to coarse. Core loss from 17.10-18.00 m.	Fluvial gravel	16.70-17.10		-
90530420	Mid orangish brown gravelly sand. Sand is fine to coarse. Gravel is angular to rounded fine to medium flint clasts. Diffuse contact.	Fluvial sand and gravel	18.00-18.30		-
90530421	Angular to rounded fine to medium flint gravel in mid orangish brown sand matrix. Sand is fine to coarse. Diffuse contact.	Fluvial sand and gravel	18.30-18.90		-
90530422	Angular to rounded fine to coarse flint gravel in mid orangish brown sand matrix. Sand is fine to medium. Diffuse contact.	Fluvial sand and gravel	18.90-19.10		-
90530423	Angular to rounded fine to coarse flint gravel. Abrupt contact.	Fluvial sand and gravel	19.10-19.50		-

90530424	Angular to rounded fine to coarse flint clasts in mid orangish brown sand. Sand is fine to coarse. Diffuse contact.	Fluvial sand and gravel	19.50-20.05		-
90530425	Predominantly fine angular to rounded flint gravel in mid orangish brown sand. Gravel becomes coarser towards base. Sharp contact.	Fluvial sand and gravel	20.05-20.45		-
90530426	Mid whitish brown chalk. Core loss from 20.75 m onwards.	Chalk bedrock	20.45-20.75+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH05309	
Coordinates (NGR) X: 567893.33		Coordinates (NGR) Y: 173970.66		Level (top): 2.08	
Length: -		Width: -		Depth: 16.50 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90530901	0.00-1.20: Hand dug trial pit. Soft dark brown very rarely mottled grey silty clay. Very rare fragments of brown fibrous organic material. Extremely rare very fine rounded flint clasts. Abrupt contact.	Alluvial clay	1.20- 1.60		-
90530902	Soft mid grey silty clay. Rare pockets of brown silty clay. Sparse dark brown fibrous organic material fragments, mainly roots and leaves. Sharp contact.	Alluvial clay	1.60- 2.40		-
90530903	Soft very dark brown to black amorphous highly compressible fibrous organic material. No large fragments visible. Sharp contact.	Peat	2.40- 2.50		-
90530904	Soft mid grey silty clay. Occasional inclusions of brown and black fibrous material (mainly roots and leaves). Sharp contact. Core loss between 3.00-3.20 m.	Alluvial clay	2.50- 4.40		-
90530905	Soft black highly compressible fibrous organic material. No large fragments visible, but parts of leaves noted. Sharp contact.	Peat	4.40- 4.50		-
90530906	Soft mid grey tending to dark grey silty clay. Occasional fragments and pockets of brown and black fibrous organic material. Extremely rare very fine rounded flint gravel. Sharp contact.	Alluvial clay	4.50- 8.50		-
90530907	Very dark brown spongy amorphous highly compressible fibrous organic material. Some individual leaf fragments visible. Sharp contact.	Peat	8.50- 8.60		-
90530908	Mid to dark grey silty clay. Moderate amounts of brown and black fibrous organic matter (degraded fragments of leaves and wood). 10.00: Frequency of clasts decreases.	Alluvial clay	8.60- 11.80		-

90530909	Black spongy amorphous highly compressible fibrous organic material. Very fragmentary. Sharp contact. Core loss between 12.00-12.15 m.	Peat	11.80-12.00		-
90530910	Soft dark grey brown slightly gravelly silty clay. Gravel is sparse fine to medium sub-angular to rounded flint. Diffuse contact	Alluvial clay	12.15-12.50		-
90530911	Firm mid grey brown silty clay. Very occasional brown fibrous organic material fragments. Rare pockets of mid yellowish brown clay. Very occasional fine rounded gravel of claystone. Abrupt contact.	Alluvial clay	12.50-13.40		-
90530912	Stiff dark grey silty clay. Compact. Abrupt contact.	Alluvial clay	13.40-13.50		-
90530913	Soft mid grey slightly clayey sandy silt. Sand is fine to medium. Abrupt contact.	Alluvial silt	13.50-14.80		-
90530914	Soft dark grey gravelly sandy silt. Sand is fine to medium. Gravel is angular to rounded fine to coarse flint. Abrupt contact.	Alluvial silt	14.80-15.00		-
90530915	Mid brown gravel of sub-angular to rounded fine to medium flint gravel. Diffuse contact.	Fluvial sand and gravel	15.00-15.40		-
90530916	Mid grey sub-angular to rounded fine to coarse flint gravel. Diffuse contact.	Fluvial sand and gravel	15.40-15.90		-
90530917	Mid brown sub-angular to rounded fine to coarse flint gravel. Diffuse contact.	Fluvial sand and gravel	15.90-16.25		-
90530918	Mid brown sandy gravelly silt. Sand is fine to medium. Gravel is sub-angular to rounded fine to coarse flint. Borehole ceased at 16.50 m bgl.	Fluvial sand and gravel	16.25-16.50+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH05310	
Coordinates (NGR) X: 567850.21		Coordinates (NGR) Y: 174210.31		Level (top): 2.30	
Length: -		Width: -		Depth: 16.50 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
90531001	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		-
90531002	Soft mid grey mottled mid brown silty clay. Very rare fine rootlets. Very rare patches of dark grey silty clay. Diffuse contact.	Alluvial clay	1.20-3.70		-
90531003	Soft dark grey silty clay. Very rare fragments of fibrous organic matter, increasing in frequency towards the base of the unit. Abrupt contact.	Alluvial clay	3.70-5.20		-
90531004	Black spongy amorphous fibrous organic material. Some obvious fragments of leaves. Abrupt contact.	Peat	5.20-5.50		-
90531005	Soft mid grey silty clay. Frequent fragments and pockets of black fibrous organic matter. Diffuse contact.	Alluvial clay	5.50-6.35		-
90531006	Soft mid grey silty clay. Appears to be extremely closely spaced planar fissures. No obvious inclusions. Abrupt contact.	Alluvial clay	6.35-7.87		-
90531007	Dark brown spongy amorphous fibrous organic material. Some leaf fragments. Sparse very fine white shells. Diffuse contact.	Peat	7.87-8.14		-
90531008	Black amorphous highly compressible fibrous organic material. Extremely rare pockets of mid grey silty clay. A few visible leaf fragments. Rare fine white speckles. Sharp contact.	Peat	8.14-8.47		-
90531009	Mid grey brown silty clay. Moderate pockets and fragments of black organic fibrous material. Soft. Abrupt contact.	Alluvial clay	8.47-9.44		-
90531010	Very dark brown to black spongy amorphous fibrous organic material. Very rare leaf and wood fragments visible to the naked eye. Abrupt contact.	Peat	9.44-9.60		-

90531011	Very dark grey gravelly clayey sand. Sand is fine to coarse. Gravel is common sub-angular to rounded flint clasts <0.06 m. Sparse pockets of black organic fibrous material. Sharp contact.	Alluvial clay	9.60-10.16		-
90531012	Soft light grey mottled light brown clay. Very rare peat fragments. Rare pockets of light red brown fine to medium sand. Very rare fine sub-rounded to rounded nodules of claystone found around 11.30 m. Diffuse contact.	Alluvial clay	10.16-11.55		-
90531013	Firm light to mid grey clay. Extremely closely to very closely spaced fissures. Diffuse contact.	Alluvial clay	11.55-12.20		-
90531014	Firm mid grey mottled mid brown clay. Rare fragments of black fibrous organic material. Extremely closely to very closely spaced fissures. Diffuse contact.	Alluvial clay	12.20-12.66		-
90531015	Firm mid reddish brown mottled grey clay. Very rare fragments of black fibrous organic material. Extremely closely to very closely fissured. Diffuse contact.	Alluvial clay	12.66-12.90		-
90531016	Firm mid brown mottled grey clay. Extremely closely to very closely spaced fissures. Very rare blue grey gleying on some fissure edges. Abrupt contact. Core loss from 13.50-13.60 m.	Alluvial clay	12.90-13.50		-
90531017	Mid grey soft clay. Very wet. Diffuse contact	Alluvial clay	13.60-14.20		-
90531018	Mid grey mottled orangish brown sandy clay. Sand is fine to medium. Abrupt contact.	Alluvial clay	14.20-14.60		-
90531019	Mid orangish grey sandy gravel. Sand is fine to coarse. Gravel is abundant angular to rounded flint clasts <0.08 m. Abrupt contact.	Fluvial sand and gravel	14.60-15.00		-
90531020	Dark brown slightly gravelly fine to coarse sand. Gravel is sub-angular to rounded fine flint. Diffuse contact.	Fluvial sand and gravel	15.00-15.25		-
90531021	Mid brown slightly sandy fine to medium sub-angular to rounded flint gravel. Sand is fine to coarse. Diffuse contact.	Fluvial sand and gravel	15.25-15.50		-

90531022	Sub-angular to rounded fine to coarse flint gravel. Abrupt contact.	Fluvial sand and gravel	15.50-15.70		-
90531023	Mid brown gravelly sand. Sand is fine to coarse. Gravel is sub-angular to rounded fine to coarse flint. Diffuse contact.	Fluvial sand and gravel	15.70-16.05		-
90531024	Sub-angular to rounded fine to coarse flint gravel. Core loss from 16.40-16.50 m.	Fluvial sand and gravel	16.05-16.50+		-

Site Code: 219246		Site Name: Lower Thames Crossing - GI monitoring		Borehole ID: BH08027		
Coordinates (NGR) X: 567132.624		Coordinates (NGR) Y: 177696.97		Level (top): 3.884		
Length: -		Width: -		Depth: 35.45 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
9080271	Mid grey brown clay. Frequent large bricks and concrete.	Made ground	0.00-4.20		-	
9080272	Mid grey brown gravelly sand. Frequent fine to medium sub-angular flint clasts.	Fluvial sand and gravel	4.20-4.80		9080272	
9080273	Mid grey fine sand.	Thanet Sand	4.80-6.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH08305		
Coordinates (NGR) X: 567052.109		Coordinates (NGR) Y: 177316.347		Level (top): 1.395		
Length: -		Width: -		Depth: 20 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
90830501	Soft dark grey brown silty clay. Common fine rootlets. Friable. Abrupt contact.	Ploughsoil	0.00-0.10		-	
90830502	Soft mid to dark grey mottled mid brown silty clay. No visible inclusions. Compact. Frequent fine rootlets. Diffuse contact.	Alluvial clay	0.10-1.70		-	
90830503	Very Soft dark grey mottled brown and mottled black silty clay. Rare preserved roots and other organic material. Diffuse contact.	Alluvial clay	1.70-2.00		-	
90830504	Very soft dark blue grey mottled black, mottled brown silty clay. Common preserved roots and rootlets. Common pockets of organic material. Change occurred in UT between 5.70 and 6.15 m so 6.00 m.	Alluvial clay	2.00-6.00		-	
90830505	Soft very dark brown to black peat. Partly decomposed mass of high compressed vegetation. Abrupt contact.	Peat	6.00-6.85		90830501	
90830506	Very soft dark blue grey silty clay. Sparse pockets of highly compressible dark brown to black fibrous material. Abrupt contact.	Alluvial clay	6.85-13.20		-	
90830507	Very soft dark grey locally black sandy silt with sparse pockets of dark grey clay, rare pockets of organic material. Water strike here, rapidly filled borehole.	Alluvial silt	13.20-13.50+		-	

Site Code: 219246		Site Name: Lower Thames Crossing - GI monitoring Phase 3		Borehole ID: BH08307	
Coordinates (NGR) X: 567013.1142		Coordinates (NGR) Y: 177603.0458		Level (top): 1.4056	
Length: -		Width: -		Depth: 10 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
9083071	Mid grey brown silty clay. Common rooting. Rare small sub-angular flint clasts. Loose compaction.	Topsoil	0.00-0.30		-
9083072	Reddish mid brown silty clay. Firm compaction. Rare fine to medium sub-angular flint clasts.	Subsoil	0.30-1.10		-
9083073	Dark blueish grey clay. Reddish yellow mottling. Rare sub-angular flint clasts. Soft.	Alluvial clay	1.10-7.40		-
9083074	Blackish brown silty clay with organic material. Forms pockets in (9083073).	Organic alluvial clay	3.20-7.40		9083074
9083075	Chalk.	Chalk bedrock	7.40-10.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH08309		
Coordinates (NGR) X: 567114.6625		Coordinates (NGR) Y: 177846.9955		Level (top): 3.7077		
Length: -		Width: -		Depth: 20 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
90830901	Fine to medium sub-angular to sub-rounded flint gravel (<50mm) in sand matrix.	Fluvial sand and gravel	0.00-4.40		-	
90830902	Fine to medium sub-angular to sub-rounded flint gravel (<70mm).	Fluvial sand and gravel	4.40-5.70		-	
90830903	Fine light yellowish grey sand.	Thanet Sand	5.70-6.50+		-	

Site Code: 219246		Site Name: Lower Thames Crossing - GI monitoring		Borehole ID: BH09305		
Coordinates (NGR) X: 566972.0271		Coordinates (NGR) Y: 178493.8988		Level (top): 11.6549		
Length: -		Width: -		Depth: 15.45 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
9093051	Mid grey brown silty clay. Frequent fine sub-angular flint clasts.	Topsoil	0.00-0.40		-	
9093052	Pale yellowish brown gravelly sandy silt. Frequent fine to medium sub-angular flint clasts.	Fluvial silt	0.40-1.70			
9093053	Fine to medium sub-angular flint gravel in yellowish red sand matrix.	Fluvial sand and gravel	1.70-1.80+		9093053	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH09306		
Coordinates (NGR) X: 567135.32		Coordinates (NGR) Y: 178483.188		Level (top): 9.95		
Length:		Width:		Depth: 10 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
90930601	Dark grey brown slightly gravelly slightly clayey sand. Sand is fine to medium. Gravel is sparse sub-angular to rounded fine to medium flint. Sharp contact.	Topsoil	0.00-0.50		-	
90930602	Mid yellowish brown gravelly silty fine to medium sand. Gravel is common sub-rounded to well-rounded fine to coarse flint. Becomes very gravelly (abundant to near complete) at 2.20 m bgl. Becomes fine to coarse sand at 2.70 m bgl. Diffuse contact.	Fluvial sand and gravel	0.50-3.50		-	
90930603	Dark yellowish brown sandy gravel. Sand is fine to coarse. Gravel is super abundant to near complete sub-rounded to well-rounded fine to coarse multicoloured flint. Sharp contact.	Fluvial sand and gravel	3.50-5.70		-	
90930604	Mid brown mottled grey fine sand.	Thanet Sand	5.70-6.00+			

Site Code: 219246		Site Name: Lower Thames Crossing - GI monitoring		Borehole ID: BH09307		
Coordinates (NGR) X: 566846.8899		Coordinates (NGR) Y: 178614.9997		Level (top): 12.0021		
Length: -		Width: -		Depth: 30.45 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
9093071	Dark greyish brown silty clay. Frequent fine sub-angular flint clasts. Rooted	Topsoil	0.00-0.40		-	
9093072	Greyish brown silty sand. Firm compaction.	Subsoil	0.40-0.70		-	
9093073	Medium sub-rounded and fine sub-angular flint gravel. Reddish yellow brown silty sand matrix	Fluvial sand and gravel	0.7-1.70		-	
9093074	Fine sub-angular flint gravel. Yellowish red sand matrix. Well sorted.	Fluvial sand and gravel	1.70-5.90		9093074	
9093075	Mid grey medium sand.	Thanet Sand	5.90-7.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing - GI monitoring		Borehole ID: BH09308		
Coordinates (NGR) X: 566934.5168		Coordinates (NGR) Y: 178649.4245		Level (top): 11.0178		
Length: -		Width: -		Depth: 20 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
9093081	Dark greyish brown silty clay. Rooted.	Topsoil	0.00-0.30		-	
9093082	Pale yellowish brown silty sand. Firm.	Subsoil	0.30-0.60		-	
9093083	Fine to medium sub-angular flint gravel. Yellowish red brown sand matrix.	Fluvial sand and gravel	0.60-5.70		9093083	
9093084	Mid grey medium sand.	Thanet Sand	5.70-7.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH10300		
Coordinates (NGR) X: 566825.7		Coordinates (NGR) Y: 178845.2		Level (top): 10.9058		
Length: -		Width: -		Depth:		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
910301	Dark brown clayey silt with occasional sub-rounded flint clasts (<=40mm).	Topsoil	0.00-0.40		-	
910302	Mid reddish brown clayey silt. Clast free.	Subsoil	0.40-0.60		-	
910303	Mid brown silty clay with very common sub-angular flint clasts (<=50mm).	Colluvial clay (Head)	0.60-0.90		-	
910304	Light reddish brown silty sand with abundant sub-angular and sub-rounded flint clasts (<=50mm).	?Colluvial sand (Head)	0.90-1.20+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH10303		
Coordinates (NGR) X: 566726.3832		Coordinates (NGR) Y: 179099.3216		Level (top): 9.8173		
Length: -		Width: -		Depth: 15 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
9103031	Dark brownish grey clayey silt with rare sub angular flint gravel \leq ($<$ 40mm).	Topsoil	0.0-0.31		-	
9103032	Mid reddish brown clayey silt with occasional sub rounded flint gravel \leq ($<$ 50mm).	Subsoil?	0.31-0.95		-	
9103033	Dark reddish brown clayey sand with common sub rounded flint gravel (\leq 50mm).	Colluvial sand (Head)	0.95-1.50		-	
9103034	Mid brownish yellow sand with very abundant, moderately well sorted, sub rounded and sub angular flint gravel \leq ($<$ 60mm).	?Fluvial sand and gravel	1.50-2.60		-	
9103035	Mid reddish brown coarse sand with common sub rounded flint gravel ($<$ 30mm).	?Fluvial sand and gravel	2.60-5.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH10305		
Coordinates (NGR) X: 566693.2064		Coordinates (NGR) Y: 179372.6816		Level (top): 5.9026		
Length: -		Width: -		Depth: 15.20 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
9103051	Dark greyish brown clayey silt with rare sub rounded flint gravel (<40mm).	Topsoil	0.00-0.20		-	
9103052	Dark blackish grey clayey silt, very waterlogged. Organic rich, peat-like.	Pond silting deposit (extant pond immediately adjacent)	0.20-0.80		-	
9103053	Mid grey sandy clay.	Alluvial clay	0.80-1.20+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH10307		
Coordinates (NGR) X: 566833.639		Coordinates (NGR) Y: 179267.913		Level (top): 5.6601		
Length: -		Width: -		Depth: 2.00 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
9103071	Mid dark brown silty clay. Rooted.	Topsoil	0.00- 0.40		-	
9103072	Mid greyish brown silty clay. Loose.	Subsoil	0.40- 0.90			
9103073	Light grey brown clayey silt. Occasional fine subangular flints clasts. Loose.	Alluvial silt	0.90- 1.70			
9103074	Mid grey patches reddish yellow. Sand fine loose compaction.	Thanet Sand	1.70- 2.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing - GI monitoring		Borehole ID: BH10312		
Coordinates (NGR) X: 566453.6		Coordinates (NGR) Y: 179661.2		Level (top): 24.0331		
Length: -		Width: -		Depth: 20 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
9103121	Mid grey brown. Silty clay. Frequent fine sub-angular flint clasts.	Topsoil	0.00-0.30			
9103122	Yellowish brown silty gravel. Frequent fine sub-angular flint clasts.	Subsoil	0.30-0.50			
9103123	Pale yellowish red sandy gravel. Frequent fine to medium sub-angular flint clasts. Loose.	Fluvial sand and gravel	0.50-1.10		9103123	
9103124	Reddish yellow sand. Occasional fine sub-angular flint clasts. Loose.	Fluvial sand	1.10-2.40			
9103125	Pale yellowish brown fine sand.	Thanet Sand	2.40-5.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH11305	
Coordinates (NGR) X: 565764.3602		Coordinates (NGR) Y: 179992.5746		Level (top): 15.8635	
Length: -		Width: -		Depth: 15 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
91130501	0.00-1.20: hand dug trial pit. Stiff orange brown sandy clay. No visible structure. Sub-round flint clasts towards base.	Colluvial clay (Head)	1.20-4.75		-
91130502	Fine firm olive brown sand.	Thanet Sand	4.75-6.75+		

Site Code: 219246		Site Name: Lower Thames Crossing - GI monitoring		Borehole ID: BH12300		
Coordinates (NGR) X: 565250.1906		Coordinates (NGR) Y: 180012.7135		Level (top): 21.1524		
Length: -		Width: -		Depth: 18.10 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
9123001	Mid grey brown silty clay. Frequent fine sub-angular flint clasts. Rooted. Loose.	Topsoil	0.00-0.30		-	
9123002	Mid yellowish brown silty sand. Frequent fine sub-angular flint clasts. Loose.	Subsoil	0.30-0.50		-	
9123003	Yellowish red brown gravelly sandy silt. Frequent fine sub-angular flint clasts. Loose.	Fluvial silt	0.50-1.65		-	
9123004	Mid grey fine sand. Clast free.	Thanet sand	1.65-3.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing - GI monitoring		Borehole ID: BH12304		
Coordinates (NGR) X: 564906.819		Coordinates (NGR) Y: 180062.352		Level (top): 23.1		
Length: -		Width: -		Depth: 20.20 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
9123041	0.00-1.20: Hand dug trial pit. Light yellowish brown silty clay. Occasional sub-rounded flint clasts. Occasional pockets of yellow sand.	?Fluvial clay	1.20-4.20		-	
	Not monitored		4.20-15.70			
9123042	Dark grey silty sand.	Thanet Sand	15.70-16.20		-	
9123043	Dark grey clayey silty sand.	Thanet Sand	16.20-18.70		-	
9123044	Chalk.	Chalk bedrock	18.70-20.20+		-	

Site Code: 219246		Site Name: Lower Thames Crossing - GI monitoring		Borehole ID: BH12306		
Coordinates (NGR) X: 564549.4244		Coordinates (NGR) Y: 180161.5002		Level (top): 22.5389		
Length: -		Width: -		Depth: 15 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
9123061	Dark grey brown silty clay. Frequent chalk flecks. Moderately frequent angular flint clasts.	Topsoil	0.00-0.30		-	
9123062	Mid yellowish brown sandy silt. Occasional fine sub-angular flint clasts. Loose.	?Fluvial silt or colluvial silt (Head)	0.30-1.40		9123062	
9123063	Light grey fine sand.	Thanet Sand	1.40-3.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: WS08004	
Coordinates (NGR) X: 567010.927		Coordinates (NGR) Y: 177596.829		Level (top): 1.4164	
Length: -		Width: -		Depth: 5 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
80800401	0.00-1.20: Hand dug trial pit. Firm Fe mottled grey brown silty clay.	Alluvial clay	1.20- 1.53		-
80800402	Firm grey silty clay with frequent horizontal darker banding.	Alluvial clay	1.53- 4.00		-
80800403	Dark brown firm organic silty clay.	Peat	4.30- 5.00+		80800401

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: WS08005		
Coordinates (NGR) X: 567195.227		Coordinates (NGR) Y: 177675.4388		Level (top): 4.3781		
Length: -		Width: -		Depth: 3 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
80800501	Firm brown silty clay loam. Frequent sub-angular to sub-rounded flint clasts.	Alluvial loam	1.20- 1.73		-	
80800502	Stiff orange brown gravelly clay.	?Alluvial clay	1.73- 2.00		-	
80800503	Stiff orange brown slightly sandy clay. Occasional fine sub-angular and sub-rounded flint clasts.	Alluvial clay	2.00- 3.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: WS08006	
Coordinates (NGR) X: 567238.1838		Coordinates (NGR) Y: 177798.443		Level (top): 3.3761	
Length: -		Width: -		Depth: 5 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
8080063	Stiff yellow brown clay, no visible structure. Sharp contact.	?Redeposited clay	1.81- 2.00		-
80800601	Stiff orange brown slightly sandy clay. Occasional fine sub-angular to sub-rounded flint clasts.	Alluvial clay (?redeposited)	1.20- 1.40		-
80800602	Firm orange sandy clay. Sand is coarse. Occasional fine sub-rounded flint clasts. Sharp contact.	?Redeposited clay	1.40- 1.81		-
80800604	Yellow brown coarse sand. Occasional sub-rounded flint clasts. Sharp contact.	?Redeposited sand	2.00- 2.20		-
80800605	Grey friable sandstone.	?Redeposited sandstone	2.20- 3.00+		--

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: WS11300	
Coordinates (NGR) X: 565413.626		Coordinates (NGR) Y: 179700.1535		Level (top): 26.3979	
Length: -		Width: -		Depth: 5 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
8113001	0.00-1.20: Hand dug trial pit. Firm brown silty clay loam. Granular structure. Moderately frequent sub-angular to sub-rounded flint clasts.	Alluvial loam (redeposited)	1.20-2.40		-
8113002	Mixed soil and cinders with metal fragments.	Made ground	2.40-2.64		-
8113003	Firm brown silty clay loam. Granular structure. Frequent sub-angular to sub-rounded flint clasts.	Alluvial loam	2.64-3.10		-
8113004	Firm light brown fine to medium sand. Some Fe staining, no visible structure. Common lateral cracking, possibly indicates laminations.	Alluvial sand	3.10-5.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH13302		
Coordinates (NGR) X:		Coordinates (NGR) Y:		Level (top):		
Length:		Width:		Depth: 10 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
9133021	Mid greyish brown slightly sandy silty clay. Occasional flint clasts (<100mm). Rooted and bioturbated.	Topsoil	0.00-0.30		-	
9133022	Yellowish brown coarse sandy gravel. Gravel is generally fine to medium (<30mm) sub-angular flint clasts.	Fluvial sand and gravel	0.30-3.70		-	
9133023	Greyish yellow sand.	Thanet Sand	3.7-5.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH13308	
Coordinates (NGR) X:		Coordinates (NGR) Y:		Level (top):	
Length:		Width:		Depth: 15 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
91330801	Pale grey silty sand (loose) with occasional rooting. Diffuse contact.	Topsoil	0.00-0.20		-
91330802	Pale brownish grey silty sand (loose) with occasional sub-rounded to sub-angular flint clasts (<4mm). Rooted. Abrupt contact.	Subsoil	0.20-0.35		-
91330803	Pale brown silty sand (loose) with frequent sub-angular to sub-rounded flint clasts (<50mm). Abrupt contact.	Fluvial sand and gravel	0.35-0.75		-
91330804	Pale yellowish brown fine sand (soft). Clast free. Abrupt contact.	Fluvial sand	0.75-1.50		-
91330805	Pale yellowish brown fine sand (loose) with frequent sub-rounded flint clasts (<50mm).	Fluvial sand and gravel	1.50-2.30		-
91330806	Pale brownish yellow sandy silty clay (soft) with occasional sub-angular to sub-rounded flint clasts(<40mm).	Fluvial clay	2.30-2.70		-
91330807	Mid yellowish brown silty sandy clay with black specks and blue grey lenses. Very occasional sub-rounded to rounded flint clasts (<30mm). Occasional bands of bluish brown clay.	Fluvial clay	2.70-4.15		-
91330808	Mid brownish/yellowish brown fine grained laminated sand.	Thanet Sand	4.15-5.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH13315		
Coordinates (NGR) X:		Coordinates (NGR) Y:		Level (top):		
Length:		Width:		Depth: 35 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91331501	Mid brown silty sandy clay (soft) with occasional to frequent sub-angular to sub-rounded flint clasts (<60mm). Rooted. Sharp contact.	Topsoil	0.00-0.30		-	
91331502	Mid orange silty clay (soft to firm) with occasional sub-angular to sub-rounded flint clasts(<40mm). Sharp horizon with above. Abrupt contact.	Subsoil	0.30-0.70		-	
91331503	Mid orange brown medium to fine grained sand (soft to loose) with occasional to frequent sub-angular to rounded flint clasts (<60mm).	Fluvial sand	0.70-3.10		9133151	
91331504	Pale brown fine grained sand (firm) with thin mid brown laminations/lenses.	Thanet Sand	3.10-4.00+			

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH13331		
Coordinates (NGR) X:		Coordinates (NGR) Y:		Level (top):		
Length:		Width:		Depth: 30 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91333101	Firm mid grey brown slightly gravelly sandy clay. Sand is fine. Gravel is occasional sub-angular to rounded flint clasts (<80mm). Friable. Diffuse contact.	Ploughsoil	0.00-0.50		-	
91333102	Firm mid brown slightly gravelly sandy clay. Sand is fine. Gravel is occasional sub-rounded to rounded flint clasts (<60mm). Compact. Diffuse contact.	Colluvial clay (Head)	0.50-0.80		91333101	
91333103	Mid yellowish brown slightly gravelly sand. Sand is fine. Gravel is moderately frequent sub-rounded to rounded flint clasts (<60mm). Compact. Abrupt contact.	Fluvial sand and gravel	0.80-1.20		91333102	
91333104	Mid yellowish brown gravelly sand. Sand is fine to medium. Gravel is frequent angular to rounded flint clasts (<60mm).	Fluvial sand and gravel	1.20-3.30		91333103	
91333105	Mid yellowish brown very slightly gravelly sand. Sand is fine to coarse. Gravel is occasional sub-angular to rounded flint clasts (<60mm).	Fluvial sand and gravel	3.30-4.80		91333104	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH13334		
Coordinates (NGR) X:		Coordinates (NGR) Y:		Level (top):		
Length:		Width:		Depth: 10 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91333401	Mid grey brown slightly gravelly sandy clay. Sand is fine. Gravel is occasional sub-rounded to rounded flint clasts (<60mm). Compact. Diffuse contact.	Ploughsoil	0.00-0.20		-	
91333402	Firm mid brown slightly gravelly sandy clay. Sand is fine. Gravel is occasional sub-rounded to rounded flint clasts (<60mm). Compact. Diffuse contact.	Colluvial clay (Head)	0.20-0.70		-	
91333403	Mid orangish brown slightly gravelly fine sand. Gravel is occasional bands of sub-angular to rounded flint clasts (<60mm). Compact.	Fluvial sand and gravel	0.70-3.15+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH13347	
Coordinates (NGR) X:		Coordinates (NGR) Y:		Level (top):	
Length:		Width:		Depth: 20 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
91334701	Soft mid brown grey slightly gravelly silty sand. Sand is fine to medium. Gravel is occasional sub-rounded to rounded flint, siltstone and quartzite clasts (<60mm). Friable. Diffuse contact.	Topsoil	0.00-0.50		-
91334702	Soft mid yellowish brown mottled mid orange brown very slightly gravelly sand. Sand is fine. Gravel is very occasional rounded flint clasts (<60mm). Friable. Below 1.00 m bgl pockets of mid grey fine sand.	Lambeth Group	0.50-2.00+		91334701

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH13354		
Coordinates (NGR) X:		Coordinates (NGR) Y:		Level (top):		
Length:		Width:		Depth: 10 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91335401	Mid greyish brown silty clay (soft) with occasional sub-angular to sub-rounded flint clasts(<40mm). Rooted. Abrupt contact.	Topsoil	0.00-0.50		-	
91335402	Mid brown silty clay sand (firm to soft) with occasional sub-angular to rounded flint clasts (<40mm). Abrupt contact	Subsoil	0.50-0.80		-	
91335403	Mid orange brown to yellowish brown medium grained silty sand (loose) with pockets (<50mm) of silty sandy clay (soft to firm). Occasional sub-angular to rounded flint clasts (<40mm).	Fluvial sand	0.80-2.70		-	
91335404	Mid orange brown to yellowish brown medium grained silty sand (loose) with pockets (<50mm) of silty sandy clay (soft to firm). Moderately frequent sub-angular to rounded flint clasts (70mm).	Fluvial sand and gravel	2.70-3.40		-	
91335405	Pale brownish grey medium to fine grained sand (loose) with sandy clay (soft to firm) pockets. Occasional to frequent sub-angular to rounded flint pebbles (<50mm), mostly black. Becomes more sandy clay and stiffer with depth.	Lambeth Group	3.40-4.50+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH14302		
Coordinates (NGR) X:		Coordinates (NGR) Y:		Level (top):		
Length:		Width:		Depth: 10 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91430201	Mid greyish brown silty clay loam (soft to firm). Occasional sub-angular to sub-rounded flint clasts (<30mm). Abrupt contact.	Topsoil	0.00-0.40		-	
91430202	Mid brown silty clay (soft to firm) with occasional sub-angular to sub-rounded flint clasts (<40mm). Diffuse contact.	Subsoil	0.40-0.60		-	
91430203	Mid brown silty sandy clay (soft) with occasional to frequent sub-angular to sub-rounded flint clasts (<40mm). Abrupt contact.	Colluvial clay (Head)	0.60-0.90		-	
91430204	Mid yellow brown medium to fine sand (loose) with pockets of mid reddish brown sandy clay (firm). Occasional sub-angular to rounded flint clasts (<60mm).	Fluvial sand	0.90-2.40		-	
91430205	Mid brown silty sandy clay (firm) with greyish hue. Occasional sub-angular to sub-rounded flint clasts (<40mm).	Fluvial clay	2.40-3.00		9143021	
91430206	Mid orange brown to yellowish brown fine to medium to fine grained sand (loose). Occasional sub-angular to rounded flint clasts (<40mm).	Fluvial sand	3.00-4.00		-	
91430207	Mid reddish brown medium grained sand (loose) with frequent sub-angular to rounded flint clasts (<80mm).	Fluvial sand and gravel	4.00-4.50		-	
91430208	Mid yellowish brown medium to coarse grained sand (loose) with greyish hue. Frequent sub-angular to rounded black/greyish brown flint gravels (<40mm).	Fluvial sand and gravel	4.50-6.00		-	
91430209	Light grey fine grained sand (compact to firm). Becomes mid yellowish brown with depth. Very occasional sub-angular to rounded flint clasts (<30mm).	Lambeth Group	6.00-6.50+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH14305	
Coordinates (NGR) X:		Coordinates (NGR) Y:		Level (top):	
Length:		Width:		Depth: 35 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
91430501	Pale greyish brown silty sandy clay with occasional sub-angular to sub-rounded flint clasts (<30mm). Loose. Rooted. Sharp contact.	Topsoil	0.00-0.19		-
91430502	Mid greyish brown with brown mottling silty sandy clay with occasional concrete/brick fragments (<70mm). Compact. Abrupt contact.	Made ground	0.19-0.40		-
91430503	Mid brown sandy clay with very occasional sub-angular to sub-rounded flint clasts (<40mm). Diffuse contact.	?Colluvial clay (Head)	0.40-0.80		-
91430504	Mid reddish brown clay sand (firm to loose) with occasional to frequent sub-angular to rounded flint clasts (<50mm). Becomes sandier and orange brown with depth. 1.60: Band of yellowish brown fine clay sand (compact to firm) with occasional flint pebbles/nodule fragments (<80mm).	Fluvial sand	0.80-3.00		-
91430505	Pale to mid greyish brown fine sandy clay (compact to stiff) with very occasional sub-rounded to rounded flint clasts (<40mm). Becomes pale grey with depth.	Lambeth Group	3.00-3.70		-
91430506	Pale brownish grey/greyish brown fine grained silty sand (compact to stiff).	Lambeth Group	3.70-4.00		-
91430507	Pale greyish brown fine grained clay sand with rare shell flecks.	Lambeth Group	4.00-4.30		-
91430508	Dark bluish grey laminated clay (compact to stiff) with occasional concentrations/bands of shell fragments. Becomes sandier, firm and less shells with depth but reverts to original characteristics at 7.70m.	Lambeth Group	4.30-8.70		-
91430509	Mid blue to mid grey fine silty sandy clay (firm to soft) with abundant rounded black flint gravels/pebbles (<40mm). Becomes pale whitish grey with depth.	Lambeth Group	8.70-10.20		-
91430510	Mid yellowish brown silty clay with sand content (firm) with abundant sub-angular to rounded flint pebbles (<30mm).	Lambeth Group	10.20-10.70		-
91430511	Mid yellow becoming mid grey fine sand (firm to soft) with bands of rounded black pebbles (<30mm).	Lambeth Group	10.70-12.00		-
91430512	Laminated fine grained sand (firm) alternating between mid-orange brown and pale yellowish brown. Sharp horizon with above.	?Thanet Sand	12.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH14307		
Coordinates (NGR) X:		Coordinates (NGR) Y:		Level (top):		
Length:		Width:		Depth: 40 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91430701	Dark brownish grey silty clay loam (soft) with occasional sub-angular to sub-rounded flint clasts(<40mm). Rooted. Abrupt contact.	Topsoil	0.00-0.35		-	
91430702	Mid brown silty clay (firm to soft) with occasional sub-angular to sub-rounded flint clasts (<40mm). Diffuse contact.	Subsoil	0.35-0.65		-	
91430703	Mid orange brown silty clay (soft) with very occasional sub-angular to sub-rounded flint clasts (<40mm). Diffuse contact.	?Colluvial clay (Head)	0.65-1.00		-	
91430704	Mid orange brown silty sand (soft) with pockets of sandy clay (firm) and occasional sub-angular to sub-rounded flint clasts (<50mm).	Fluvial clay	1.00-2.50		-	
91430705	Mid greyish silty sand (soft to loose) with occasional sub-angular to rounded flint clasts (<60mm).	Fluvial sand	2.50-3.30		-	
91430706	Pale greyish brown silty sand (soft) with frequent sub-angular to rounded flint clasts (<60mm).	Fluvial sand and gravel	3.30-4.70		-	
91430707	Mid brown coarse grained sand (loose) with frequent sub-angular to rounded flint clasts (<50mm).	Fluvial sand and gravel	4.70-6.50		-	
91430708	Mid to pale brown medium to fine grained sand (loose to soft) with frequent to near complete sub-angular to rounded flint gravel (<40mm), mostly dark grey/black.	Fluvial sand and gravel	6.50-9.10		-	
91430709	Mid orange brown fine grained sandy clay (stiff) with very occasional sub-angular to sub-rounded flint clasts (<30mm). Becomes grey with depth.	Lambeth Group	9.10-9.50+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH14333		
Coordinates (NGR) X:		Coordinates (NGR) Y:		Level (top):		
Length:		Width:		Depth: 20 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
9143331	Greyish brown sandy silty clay with occasional flint clasts (generally <50mm). Rooted.	Topsoil	0.00-0.20		-	
9143332	Yellowish brown lightly sandy gravelly clay.	Subsoil	0.20-0.50		-	
9143333	Greyish brown slightly clayey gravelly sand.	Fluvial sand and gravel	0.50-1.00		-	
9143334	Gravelly coarse sand.	Fluvial sand and gravel	1.00-5.00		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH14343		
Coordinates (NGR) X:		Coordinates (NGR) Y:		Level (top):		
Length:		Width:		Depth: 30 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91434301	Mid to dark greyish brown silty clay (soft) with slight sand content. Occasional sub-angular to sub-rounded flint clasts (<50mm). Sharp contact.	Topsoil	0.00-0.40		-	
91434302	Mid brown silty clay with reddish brown mottling (soft to firm). Occasional sub-angular to rounded flint clasts (<40mm). Sharp contact.	Subsoil	0.40-0.50		-	
91434303	Mix of pale grey and mid reddish brown sand (loose) with frequent sub-angular to rounded flint clasts (<30mm).	Fluvial sand and gravel	0.50-1.20+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH16316	
Coordinates (NGR) X:		Coordinates (NGR) Y:		Level (top):	
Length:		Width:		Depth: 15 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
91631601	Hand dug trial pit	Hand dug trial pit	0.00-1.20		-
91631602	Mid yellow brown slightly silty sand. Fine to medium sand. Occasional fine sub-angular flints. Interbedded with bands of grey clay. Sand component slightly coarser at depth.	Fluvial sand	1.20-3.70		-
91631603	Mid yellow brown silty sand. Sand is medium. Occasional clay bands of clay throughout.	Fluvial sand	3.70-4.30		-
91631604	Mid yellowish brown fine to medium sand. Occasional fine and medium sub-angular flint clasts. Bulk sample taken from 5m bgl.	Fluvial sand	4.30-5.90		91631601
91631605	Mid to dark grey clayey sand and organic material. Fine sand. Occasional fine sub-angular flint gravels. Laminated. Soft at top of deposit, firmer/stiffer at depth. Bulk sample taken from 6.00-7.40m bgl.	Fluvial organic sand	5.90-8.40		91631602
91631606	Dark grey slightly sandy clay. Very stiff. Very fine sand.	Fluvial clay.	8.40-10.20		-
91631607	Grey with bluish hue silty sand. Occasional fine sub-angular flint clasts. Sand is fine. Thin interbedded grey clay bands.	Fluvial sand	10.20-11.00		-
91631608	Small to medium sub-angular and sub-rounded flint gravel. Very fine grey silty sand matrix	Fluvial sand and gravel	11.00-11.8.00		-
91631609	Light to mid blue grey silty clay. Very stiff. Pockets of silt, lithorelicts and common pyrite. Sampled from c. 12.5m bgl	?Weathered/ reworked London Clay	11.80-13.30		91631603
91631610	Mid grey clay with pockets of light grey clay silt.	London Clay	13.30-15.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: WS14300		
Coordinates (NGR) X:		Coordinates (NGR) Y:		Level (top):		
Length:		Width:		Depth: 3.20 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
81430001	Hand dug trial pit.	Hand dug trial pit	0.00-1.20		-	
81430002	Light yellowish brown slightly gravelly fine to medium sand. Gravel is occasional sub-rounded to rounded fine to medium flint. Poorly sorted. Diffuse contact.	Fluvial sand and gravel	1.20-1.90		-	
81430003	Mid yellowish brown slightly gravelly fine to coarse sand. Gravel is frequent sub-rounded to rounded fine flint with rare sub-rounded to rounded medium flint. Diffuse contact.	Fluvial sand and gravel	1.90-2.50		-	
81430004	Light yellowish brown slightly gravelly fine to medium sand. Gravel is occasional sub-rounded to rounded fine to medium flint. Diffuse contact.	Fluvial sand	2.50-2.85		-	
81430005	Mid yellowish brown slightly gravelly fine to coarse sand. Gravel is frequent sub-rounded to rounded fine flint with rare sub-rounded to rounded medium flint. Diffuse contact.	Fluvial sand and gravel	2.85-3.10		-	
81430006	Dark yellowish brown with a greyish hue slightly gravelly fine to coarse sand. Gravel is frequent sub-rounded to rounded fine flint with very rare rounded medium flint.	Fluvial sand and gravel	3.10-3.20+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH16316	
Coordinates (NGR) X: 557937.938		Coordinates (NGR) Y: 185054.207		Level (top): 28.600	
Length: -		Width: -		Depth: 15 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
91631601	Not monitored as starter pit dug 09.09.20 prior to monitoring.	Topsoil overlying fluvial sand	0.00-1.20		-
91631602	Mid yellow brown slightly silty sand. Fine to medium sand. Occasional fine sub-angular flints. Interbedded with bands of grey clay. Sand component slightly coarser at depth.	Fluvial sand	1.20-3.70		-
91631603	Mid yellow brown silty sand. Sand is medium. Occasional bands of clay throughout.	Fluvial sand	3.70-4.30		-
91631604	Mid yellowish brown fine to medium sand. Occasional fine and medium sub-angular flint clasts. Bulk sample taken from 5m bgl.	Fluvial sand	4.30-5.90		91631601
91631605	Mid to dark grey clayey sand and organic material. Fine sand. Occasional fine sub-angular flint gravels. Laminated. Soft at top of deposit, firmer/stiffer at depth. Bulk sample taken from 6.00-7.40m bgl.	Fluvial organic sand	5.90-8.40		91631602
91631606	Dark grey slightly sandy clay. Very stiff. Very fine sand.	Fluvial clay.	8.40-10.20		-
91631607	Grey with bluish hue silty sand. Occasional fine sub-angular flint clasts. Sand is fine. Thin interbedded grey clay bands.	Fluvial sand	10.20-11.00		-
91631608	Small to medium sub-angular and sub-rounded flint gravel. Very fine grey silty sand matrix	Fluvial sand and gravel	11.00-11.80		-
91631609	Light to mid blue grey silty clay. Very stiff. Pockets of silt, lithorelicts and common pyrite. Sampled from c. 12.5m bgl	?Weathered/ reworked London Clay	11.80-13.30		91631603
91631610	Mid grey clay with pockets of light grey clay silt.	London Clay	13.30-15.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH17306	
Coordinates (NGR) X: 561903.747		Coordinates (NGR) Y: 183571.095		Level (top): 3.711	
Length: -		Width: -		Depth: 35 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
91730601	Firm very dark grey brown slightly sandy slightly gravelly silty clay. Sand is fine to medium. Gravel is rare sub-rounded to rounded flint (<60mm). Frequent fine rootlets. Compact. Abrupt contact.	Topsoil	0.00- 0.25		-
91730602	Stiff mid grey with mottles of brown silty clay. Rare fine rootlets. Occasional sub-rounded to rounded flint clasts (<60mm). Compact. Abrupt contact.	Subsoil	0.25- 0.50		-
91730603	Light grey slightly sandy soft clayey silt with mottles of brown. Sand is fine to medium. Friable. Abrupt contact.	Alluvial silt	0.50- 0.80		9170601
91730604	Mid orangish brown soft slightly gravelly clay. Gravel is very occasional sub-rounded to rounded flint clasts (<40mm). Extremely closely and very closely spaced fissures with grey gleying on fissure edges. Compact.	Weathered London Clay	0.80- 1.50+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH17307		
Coordinates (NGR) X: 561956.387		Coordinates (NGR) Y: 183586.959		Level (top): 3.729		
Length: -		Width: -		Depth: 20 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91730701	Stiff dark grey brown slightly sandy slightly gravelly silty clay. Common fine rootlets. Sand is fine to medium. Gravel is occasional sub-angular to rounded flint clasts (<6 cm). Compact. Diffuse contact.	Topsoil	0.00-0.45		-	
91730702	Very stiff dark grey brown slightly gravelly clay. Gravel is sparse sub-angular to rounded flint clasts (<60mm). Occasional sub-angular chalk fragments. Compact. Diffuse contact.	Subsoil	0.45-0.90		-	
91730703	Stiff mid orange brown with rare grey mottled fissured clay. Rare pockets of black organic material. Compact.	London Clay	0.90-1.50+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH17308		
Coordinates (NGR) X: 561943.596		Coordinates (NGR) Y: 183626.022		Level (top): 3.729		
Length: -		Width: -		Depth: 30 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91730801	Mid to dark grey brown slightly sandy slightly gravelly firm silty clay. Sand is fine to coarse. Gravel is angular to sub-rounded flint clasts (<80mm). Frequent roots and fine rootlets. Compact. Diffuse contact.	Topsoil	0.00- 0.40		-	
91730802	Dark grey brown slightly gravelly firm silty clay. Gravel is occasional sub-angular to sub-rounded flint clasts <0.06 m. Compact. Moderately frequent fine rootlets. Abrupt contact.	Subsoil	0.40- 0.55		-	
91730803	Firm light grey silty clay with orange mottles. Clast free. Compact. Abrupt contact.	Alluvial clay	0.55- 1.00		-	
91730804	Mid orange brown clay. Occasional sub-rounded to rounded flint clasts (<40mm). Compact.	London Clay	1.00- 1.80+			

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH17310	
Coordinates (NGR) X: 561836.883		Coordinates (NGR) Y: 183724.670		Level (top): 3.970	
Length: -		Width: -		Depth: 20 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
91731001	Very stiff desiccated dark brown slightly sandy clay. Sand is fine to coarse. Rare sub-angular fine to medium flint and chalk gravel. Frequent rootlets. Abrupt contact.	Topsoil	0.00-0.30		-
91731002	Very stiff brown, locally mottled orangish brown and yellowish brown slightly sandy clay. Sand is fine. Occasional sub-angular fine and medium flint gravel. 0.60-1.00: grey mottles. Abrupt contact.	?Colluvial clay (Head)	0.30-1.00		-
91731003	Very stiff (tending to extremely weak) locally mottled orangish brown and light grey slightly sandy gravelly indurated clay. Sand is fine to coarse. Gravel is angular to sub-rounded fine to coarse flint. Abrupt contact.	Weathered London Clay	1.00-1.20		-
91731004	Firm brown mottled orangish brown and light bluish grey clay with rare pockets of light grey calcareous fine to coarse sand. Fissures are randomly orientated, extremely closely and very closely spaced, planar smooth locally polished, occasionally light bluish grey.	London Clay	1.20-1.50+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH17311		
Coordinates (NGR) X: 561668.594		Coordinates (NGR) Y: 183840.799		Level (top): 4.688		
Length: -		Width: -		Depth: 15 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91731101	Stiff dark grey brown slightly sandy slightly gravelly silty clay. Sand is fine to medium. Gravel is occasional sub-angular to rounded flint clasts (<80mm). Compact. Diffuse contact.	Topsoil	0.00-0.30		-	
91731102	Soft mid yellowish brown slightly gravelly silty clay. Gravel is occasional sub-rounded to rounded flint (<60mm) and very occasional sub-rounded to rounded chalk (<40mm). Compact. Diffuse contact.	Alluvial clay	0.30-0.80		-	
91731103	Firm mid brown, mottled grey clay. Frequent pockets of mid whitish grey silt. Occasional pockets of white calcareous material degrading to sand. Compact. Diffuse contact.	Alluvial clay	0.80-1.20		-	
91731104	Stiff dark brown mottled dark grey clay. Blue grey gleying on fissure edges. Rare pockets of white brown and grey silt. Compact.	Weathered London Clay	1.20-1.50+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH17312		
Coordinates (NGR) X: 561536.047		Coordinates (NGR) Y: 183908.337		Level (top): 5.236		
Length: -		Width: -		Depth: 15 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91731201	Dark grey brown soft slightly gravelly slightly sandy silty clay. Sand is fine to medium. Gravel is occasional sub-angular to rounded flint clasts (<80mm). Occasional sub-rounded chalk flecks and fragments. Compact. Abrupt contact.	Topsoil	0.00-0.30		-	
91731202	Firm yellowish brown with mottled orange slightly gravelly slightly sandy clay. Sand is fine to medium. Pockets of whitish calcareous silt. Gravel is rounded to sub-rounded flint clasts (<60mm). Diffuse contact.	Colluvial clay (Head)	0.30-0.70		-	
91731203	Dark brown with mottled orange firm slightly sandy slightly gravelly clay. Sand is fine to medium. Pockets of whitish calcareous silt, degrading to sand. Occasional sub-rounded to rounded flint clasts (<40mm). Extremely closely spaced fissures. Abrupt contact.	Weathered London Clay	0.70-1.60		-	
91731204	Dark brown stiff clay. Extremely closely to very closely spaced fissures. Blue grey gleying on fissure edges. Pockets of mid orange brown silt. Abrupt contact.	London Clay	1.60-3.45		-	
91731205	Dark blue grey very stiff clay. Very rare white macro forams. No sign of fissuring.	London Clay	3.45-3.50+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH17314		
Coordinates (NGR) X: 561451.556		Coordinates (NGR) Y: 183661.728		Level (top): 4.595		
Length: -		Width: -		Depth: 20 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91731401	Very dark grey brown slightly sandy slightly gravelly firm silty clay. Sand is fine to medium. Gravel is occasional sub-angular to rounded flint clasts (<60mm). Compact. Abrupt contact.	Topsoil	0.00- 0.20		-	
91731402	Mottled dark grey brown and orange brown slightly gravelly firm silty clay. Occasional sub-rounded to rounded flint clasts (<50mm). Compact. Diffuse contact.	Subsoil	0.20- 0.45		-	
91731403	Mottled dark orange brown slightly gravelly silty clay. Occasional sub-rounded to rounded flint clasts (<80mm). Compact. Diffuse contact.	Colluvial clay (Head)	0.45- 3.00		-	
91731404	Dark orange with grey mottles firm silty clay. Compact.	London Clay	3.00- 5.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH17315		
Coordinates (NGR) X: 561631.423		Coordinates (NGR) Y: 183747.096		Level (top): 4.650		
Length: -		Width: -		Depth: 20 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91731501	Firm dark brown silty clay. Frequent rootlets. Abrupt contact.	Topsoil	0.00- 0.35		-	
91731502	Stiff slightly sandy slightly gravelly brown clay. Gravel is angular and sub-angular fine carbonate disintegrating to fine to coarse grey sand. Abrupt contact.	Colluvial clay (Head). Possibly weathered London Clay	0.35- 3.65		-	
91731503	Very stiff mid to dark grey clay. Compact.	London Clay	3.65- 5.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH17316		
Coordinates (NGR) X: 561763.076		Coordinates (NGR) Y: 183661.940		Level (top): 3.854		
Length: -		Width: -		Depth: 20 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91731601	Stiff dark grey brown slightly sandy slightly gravelly silty clay. Sand is fine to medium. Gravel is occasional sub-angular to rounded flint clasts (<40mm). Very common fine rootlets. Compact. Abrupt contact.	Topsoil/ ploughsoil	0-0.40		-	
91731602	Firm mid yellowish brown mottled light grey and light orangish brown slightly sandy clay. Sand is fine to coarse. Very occasional sub-angular to rounded flint clasts (<20mm). Rare trace fragments of charcoal. Compact. Diffuse contact.	Alluvial clay	0.40- 0.80		-	
91731603	Firm dark brown mottled yellowish brown and grey brown slightly gravelly fissured clay. Fissures are extremely closely and very closely spaced with grey gleying on fissure edges. Gravel is very occasional sub-rounded to rounded flint clasts (<60mm). Pockets of fine to coarse sand. Very rare sub-rounded to rounded calcareous siltstone (<40mm). Pockets of orange silt. Compact.	Weathered London Clay	0.80- 1.50+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH18302		
Coordinates (NGR) X: 561307.841		Coordinates (NGR) Y: 184052.070		Level (top): 5.422		
Length: -		Width: -		Depth: 30 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91830201	Very dark grey brown firm slightly gravelly silty clay. Gravel is occasional sub-angular to rounded flint clasts (<60mm). Friable. Abrupt contact.	Topsoil	0.00-0.30		-	
91830202	Dark orange brown firm very slightly gravelly clay. Gravel is very occasional sub-rounded to rounded flint clasts (<80mm). Compact. Abrupt contact.	Colluvial clay	0.30-0.85		-	
91830203	Mid to dark orange brown slightly sandy slightly gravelly clay. Sand is fine to medium. Gravel is frequent sub-angular to rounded flint (<60mm). Compact. Abrupt contact.	Alluvial clay	0.85-1.40		-	
91830204	Stiff dark brown locally mottled orangish brown and bluish grey clay. Very rare sugary selenite.	London Clay	1.40-1.80+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH18303		
Coordinates (NGR) X: 560652.628		Coordinates (NGR) Y: 184066.811		Level (top): 8.472		
Length: -		Width: -		Depth: 10 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91830301	Very stiff brown slightly gravelly silty clay. Gravel is angular to sub-angular fine and medium flint and brick. Abrupt contact.	Topsoil	0.00- 0.25		-	
91830302	Very stiff brown mottled grey clay. Occasional pockets of light grey fine to coarse calcareous sand. Occasional rootlets. Occasional angular and sub-angular fine flint gravel. Diffuse contact.	Colluvial clay (Head)	0.25- 1.20		-	
91830303	Very stiff brown mottled grey clay. Frequent pockets of light grey fine calcareous sand.	London Clay	1.20- 2.50+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH18304		
Coordinates (NGR) X: 560898.427		Coordinates (NGR) Y: 184060.482		Level (top): 6.760		
Length: -		Width: -		Depth: 10 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91830401	Stiff mid grey brown very slightly gravelly silty clay. Gravel is occasional sub-rounded to rounded flint clasts <40mm. Common fine rootlets. Compact. Abrupt contact.	Topsoil	0.00-0.35		-	
91830402	Very stiff mid brown slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is occasional sub-rounded to rounded flint clasts (<60mm). Occasional mottles of grey and orange brown clay. Gravel becomes more frequent towards base of unit. Compact. Diffuse contact.	Colluvial clay (Head)	0.35-0.90			
91830403	Very stiff dark brown slightly gravelly fissured clay. Gravel is very occasional sub-rounded to rounded flint clasts (<60mm). Very rare degraded calcareous silts. Blue grey gleying on fissure edges. Compact.	London Clay	0.90-2.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH18305	
Coordinates (NGR) X: 560693.580		Coordinates (NGR) Y: 184080.685		Level (top): 8.271	
Length: -		Width: -		Depth: 20 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
91830501	Very stiff dark brown slightly sandy clay. Sand is fine to coarse. Occasional sub-angular flint clasts (<6mm). Very occasional sub-angular chalk fragments. Frequent rootlets. Compact. Diffuse contact.	Topsoil	0.00-0.30		-
91830502	Very stiff brown, locally mottled orangish brown and yellowish brown slightly sandy clay. Sand is fine. Occasional sub-angular flint clasts (<50mm). Compact. Abrupt contact.	Colluvial clay (Head)	0.30-0.70		-
91830503	Very stiff to hard indurated brown slightly sandy gravelly clay. Sand is coarse. Gravel is frequent angular to rounded flint clasts (<80mm); well sorted. Compact. Abrupt contact.	?Colluvial clay (Head)	0.70-0.85		-
91830504	Stiff mid brown mottled orangish brown and bluish grey clay. Rare pockets of light grey calcareous fine to coarse sand. Fissures are extremely closely spaced to very closely spaced, randomly orientated, planar, smooth, locally polished, occasionally gleyed. Compact.	London Clay	0.85-1.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH18306		
Coordinates (NGR) X: 561031.525		Coordinates (NGR) Y: 184099.558		Level (top): 6.045		
Length: -		Width: -		Depth: 35 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91830601	Firm to stiff dark grey brown slightly sandy slightly gravelly silty clay. Sand is fine to medium. Gravel is occasional sub-angular and rounded flint clasts (<60mm). Friable. Frequent fine rootlets. Abrupt contact.	Topsoil	0.00-0.50		-	
91830602	Stiff dark orangish brown slightly gravelly slightly sandy clay. Sand is fine to medium. Gravel is occasional fine to medium sub-rounded to rounded flint clasts (<60mm). Compact. Abrupt contact	Colluvial clay (Head)	0.50-0.90		-	
91830603	Stiff dark brown mottled grey gravelly clay. Gravel is frequent fine sub-rounded to rounded flint (<40mm). Compact. Rare partings of white calcareous sand. Abrupt contact. Rare pockets of orange clay. Rare pockets of selenite crystals. Clay is fissured with extremely closely spaced to very closely spaced fissures, randomly orientated. Blue grey gleying on some fissure edges.	Weathered London Clay	0.90-1.50		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH18307		
Coordinates (NGR) X: 561280.245		Coordinates (NGR) Y: 184226.325		Level (top): 4.891		
Length: -		Width: -		Depth: 20 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91830701	Soft dark brown slightly gravelly slightly sandy silty clay. Sand is fine to coarse. Gravel is occasional sub-rounded to rounded flint clasts (<60mm). Common fine rootlets. Friable. Diffuse contact.	Topsoil	0.00-0.30		-	
91830702	Firm dark brown slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is occasional sub-rounded to rounded flint clasts (<80mm). Occasional fine rootlets. Compact. Abrupt contact.	Subsoil	0.30-0.50		-	
91830703	Dark yellowish brown firm slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is occasional sub-rounded to rounded flint clasts (<40mm). Compact. 0.70m: becomes sandy clay. Abrupt contact.	Alluvial clay	0.50-0.90		-	
91830704	Firm dark yellowish brown sandy gravelly clay. Sand is fine to coarse. Gravel is frequent sub-angular to rounded flint clasts (<80mm). Compact. Abrupt contact.	Alluvial clay	0.90-1.20		-	
91830705	Firm mid brown mottled grey slightly gravelly clay. Gravel is occasional sub-rounded to rounded flint clasts (<70mm). Occasional whitish calcareous gravel.	Weathered London Clay	1.20-1.50+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH19300	
Coordinates (NGR) X: 559784.790		Coordinates (NGR) Y: 183739.115		Level (top): 22.831	
Length: -		Width: -		Depth: 15 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
91930001	Dark grey brown slightly sandy slightly gravelly silty clay. Sand is fine to medium. Gravel is occasional sub-angular and rounded flint clasts (<70mm). Frequent fine rootlets. Friable. Abrupt contact.	Ploughsoil	0.00-0.40		-
91930002	Very stiff light brown mottled orangish brown slightly sandy slightly gravelly clay. Sand is fine to medium. Gravel is frequent angular and sub-rounded flint clasts (<60 mm). Occasional laminations. Abrupt contact.	Fluvial clay	0.40-1.05		91930001
91930003	Light brown and orangish brown slightly gravelly clayey fine to coarse sand, tending to sandy clay. Gravel is sub-angular to rounded flint clasts (<80mm). Sharp contact.	Fluvial clay	1.05-3.15		91930002, 91930003,
91930004	Mid brownish grey stiff clay. Fissured. Blue grey gleying on fissure edges.	London Clay	3.15-5.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH19301	
Coordinates (NGR) X: 559901.980		Coordinates (NGR) Y: 183807.259		Level (top): 21.608	
Length: -		Width: -		Depth: 20 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		-
91930101	Dark greyish brown gravelly coarse sandy clay. <1% fine to coarse (10-40mm) poorly sorted rounded, sub-rounded and sub-angular flint clasts. Poorly consolidated.	Colluvial clay (Head)	1.20-1.70		-
91930102	Dark brownish green clay. <1% fine to medium (10-30mm) poorly sorted sub-angular and sub-rounded flint clasts.	?Colluvial clay (Head)/ Weathered London Clay	1.70-3.30		-
91930103	Dark brownish green clay. Clast free. Well consolidated.	London Clay	4.50-6.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH19302		
Coordinates (NGR) X: 559981.778		Coordinates (NGR) Y: 183820.250		Level (top): 20.284		
Length:		Width:		Depth: 30 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91930201	Stiff dark brown slightly sandy slightly gravelly silty clay. Sand is fine to coarse. Occasional sub-angular to rounded fine to coarse flint clasts. Compact. Abrupt contact.	Topsoil	0.00-0.35		-	
91930202	Very stiff light brown mottled orangish brown slightly sandy slightly gravelly clay. Sand is fine to medium. Occasional sub-angular to rounded fine to coarse flint clasts. Abrupt contact.	Colluvial clay (Head)	0.35-1.40			
91930203	Stiff mid to dark brown mottled mid orange clay. Extremely closely to very closely spaced planar fissures. Compact. Very rare sub-rounded to rounded flint clasts.	Weathered London Clay	1.40-1.90+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH19304		
Coordinates (NGR) X: 559744.167		Coordinates (NGR) Y: 183912.486		Level (top): 23.776		
Length: -		Width: -		Depth: 15 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91930401	Dark grey brown slightly sandy slightly gravelly silty clay. Sand is fine to medium. Gravel is occasional sub-angular and rounded flint clasts (<80mm). Common fine rootlets. Soft. Abrupt contact.	Topsoil	0.00-0.35		-	
91930402	Soft light brown slightly gravelly sandy clay. Sand is fine to medium. Gravel is occasional sub-rounded to rounded flint clasts (<60mm). Abrupt contact.	?Colluvial clay (Head)	0.35-0.80		-	
91930403	Soft mid orangish brown slightly gravelly sandy clay tending to clayey sand. Pockets of blue grey clay. Sand is fine. Gravel is occasional sub-rounded to rounded flint (<50mm), predominantly fine. Diffuse contact.	Fluvial sand	0.80-1.20		-	
91930404	Soft light brown slightly gravelly slightly clayey fine sand. Gravel is fine and medium sub-rounded to rounded flint (<40mm). Diffuse contact.	Fluvial sand	1.20-2.00		91930401	
91930405	Light brown slightly gravelly sandy clay tending to fine sand. Gravel is fine sub-rounded flint (<40mm). Abrupt contact.	Fluvial sand	2.00-2.65		-	
91930406	Stiff grey mottled brown clay. Compact.	London Clay	2.65-4.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH19305		
Coordinates (NGR) X: 560091.025		Coordinates (NGR) Y: 183928.963		Level (top): 20.978		
Length: -		Width: -		Depth: 20 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91930501	Dark grey brown slightly sandy silty clay with fairly frequent flint clasts (<100mm). Sand is fine to medium. Gravel is sub-angular to rounded flint clasts. Compact. Moderate rooting from crop. Abrupt contact.	Topsoil	0.00-0.30		-	
91930502	Mid brownish slightly sandy clay with very occasional fine flint clasts (<50mm). Sand is fine to medium. Top 0.20m slightly gravellier.	Colluvial clay (Head)	0.30-1.00		-	
91930503	Very stiff mid brown fissured clay.	London Clay	1.00-1.20+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH19309	
Coordinates (NGR) X: 560103.092		Coordinates (NGR) Y: 184003.769		Level (top): 22.047	
Length: -		Width: -		Depth: 20 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	0.00-1.80: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		-
91930901	Dark greyish brown silty clay. Clast free. Well consolidated.	?Alluvial clay	1.80-2.20		-
91930902	Dark greenish brown clay with bluish green mottles. Clast free. well consolidated.	London Clay	2.50-5.50+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH19310		
Coordinates (NGR) X: 560506.360		Coordinates (NGR) Y: 184067.727		Level (top): 10.260		
Length: -		Width: -		Depth: 15 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91931001	Very dark grey brown stiff slightly gravelly slightly sandy silty clay. Sand is fine to medium. Gravel is occasional sub-angular to rounded flint clasts (<80mm). Very rare brick fragments. Frequent fine rootlets. Compact. Abrupt contact.	Topsoil	0.00-0.35		-	
91931002	Dark yellowish brown slightly gravelly slightly sandy stiff to very stiff clay. Sand is fine to medium. Gravel is occasional sub-angular to rounded flint clasts (<80mm). Compact. Diffuse contact.	Colluvial clay (Head)	0.35-1.10		-	
91931003	Very stiff mid to dark brown mottled mid orange clay. Extremely closely to very closely spaced planar fissures. Compact. Very rare sub-rounded to rounded flint clasts (<60mm).	London Clay	1.10-1.20+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH20300	
Coordinates (NGR) X: 559636.477		Coordinates (NGR) Y: 183691.507		Level (top): 23.559	
Length: -		Width: -		Depth: 15 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
92030001	Firm mid to dark grey brown slightly sandy slightly gravelly silty clay. Sand is fine to medium. Gravel is occasional angular to rounded flint clasts (<80mm). Compact. Diffuse contact.	Topsoil/ ploughsoil	0-0.35		-
92030002	Mid brown slightly sandy gravelly clay. Sand is fine to medium. Gravel is frequent sub-angular to rounded flint clasts (<80mm). Compact. Diffuse contact.	Fluvial sand and gravel	0.35-0.70		-
92030003	Dark orangish brown and light brown gravelly sand. Sand is fine to coarse. Gravel is very frequent sub-angular to rounded flint clasts (<80mm). Compact. Diffuse contact.	Fluvial sand and gravel	0.70-1.10		-
92030004	Very dark orangish brown slightly clayey gravelly sand. Sand is fine to medium. Gravel is frequent sub-angular to rounded flint (<70mm). Compact. Abrupt contact.	Fluvial sand and gravel	1.10-1.90		-
92030005	Dark brown mottled grey clay. Compact.	London Clay	1.90-2.50+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH20302		
Coordinates (NGR) X: 559645.241		Coordinates (NGR) Y: 183775.465		Level (top): 23.190		
Length: -		Width: -		Depth: 20 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
92030201	Dark grey brown slightly gravelly slightly sandy silty clay. Sand is fine. gravel is sparse sub-angular to rounded flint (<6mm) and rare sub-rounded to rounded chalk (<3mm). Stiff. Abrupt contact.	Ploughsoil	0.00-0.30		-	
92030202	Mid yellowish brown stiff slightly gravelly very sandy clay. Sand is fine to medium. Gravel is occasional sub-angular to rounded flint clasts (<60mm). Diffuse contact.	Subsoil	0.30-0.60		92030201	
92030203	Very stiff dark yellowish brown slightly sandy slightly gravelly clay. Sand is fine. Gravel is occasional sub-angular to rounded flint clasts (<60mm). Compact. Diffuse contact.	Colluvial clay (Head)	0.60-0.90		92030202	
92030204	Mid orangish brown, locally mottled mid grey brown very stiff slightly gravelly clayey fine to coarse sand. Gravel is moderately frequent sub-angular to rounded flint (<40mm). Compact. Abrupt contact.	Colluvial sand (Head)	0.90-1.55		92030203	
92030205	Light yellowish brown gravelly fine to coarse sand. Gravel is frequent sub-angular to rounded flint clasts <0.04 m. Compact. Observed at base of liner from first run of dynamic sampling.	Fluvial sand and gravel	1.55-1.80+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH20303		
Coordinates (NGR) X: 559581.993		Coordinates (NGR) Y: 183777.355		Level (top): 23.150		
Length: -		Width: -		Depth: 15 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
92030301	Dark grey brown silty clay loam. Granular/ blocky structure.	Ploughsoil	0.00-0.30		-	
92030302	Stiff medium grey brown silty clay loam with a blocky structure.	Subsoil	0.30-0.90		-	
92030303	Stiff yellow brown silty clay with occasional fine to medium sub-angular and sub-rounded flint clasts (<30mm).	Colluvial clay (Head)	0.90-1.30		-	
92030304	Stiff sandy clay with occasional fine to medium sub-angular and sub-rounded flint clasts (<40mm). Heavily oxidized becoming grey with depth.	Colluvial clay (Head)	1.30-1.50		-	
92030305	Stiff gravely sandy clay. Frequent fine to medium poorly sorted sub-angular and sub-rounded flint clasts (<40m). Some oxidation at top.	Colluvial clay (Head)	1.50-2.40		-	
92030306	Stiff dark grey brown clay.	London Clay	2.40-3.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH20304		
Coordinates (NGR) X: 559206.835		Coordinates (NGR) Y: 183794.831		Level (top): 21.601		
Length: -		Width: -		Depth: 10 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
92030401	Dark brown sandy loam with sparse sub angular to sub-rounded flint clasts (<10mm). Abrupt contact.	Topsoil	0.00-0.30		-	
92030402	Yellowish brown slightly sandy clay with greyish mottles. Occasional sub-angular and rounded flint clast (<80mm). Diffuse contact.	Subsoil	0.30-0.60		-	
92030403	Yellowish brown slightly sandy slightly gravelly clay. Occasional sub-angular and rounded flint clasts (<100mm). Abrupt contact.	Head	0.60-1.0		-	
92030404	Yellowish brown firm sandy gravelly clay with grey mottles and fissures.	Weathered London Clay	1.00-1.90			
92030405	Firm slightly sandy grey clay.	London Clay	1.90+			

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH20305	
Coordinates (NGR) X: 559647.477		Coordinates (NGR) Y: 183821.654		Level (top): 23.272	
Length: -		Width: -		Depth: 30 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		-
92030501	Mid brownish grey to greyish red mottled medium sandy clay. <1% fine to medium angular and sub-angular poorly sorted flint clasts towards base of deposit. Abrupt contact.	Colluvial clay (Head)	1.20-2.10		-
92030502	Fine to medium (5-30mm) angular, sub-angular and sub-rounded flint gravels in a coarse greyish yellow sand matrix, becoming brownish red with depth. Moderately sorted. Poorly consolidated. Sharp contact.	Fluvial sand and gravel	2.10-3.00		-
92030503	Dark brownish green silty clay. <1% fine to medium rounded and sub-rounded flint clasts (5-20mm). Well consolidated	London Clay	3.00-4.50+		

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH20306		
Coordinates (NGR) X: 559572.058		Coordinates (NGR) Y: 183820.393		Level (top): 23.218		
Length: -		Width: -		Depth: 25 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
92030601	Light greenish grey fine sandy gravelly clay. <10% fine to medium (5-15mm) angular and sub-angular flint clasts. Well consolidated. Sharp contact.	Alluvial clay	1.30- 1.70		-	
92030602	Fine to coarse (5-40mm) angular, sub-angular and sub-rounded flint gravel in a greenish grey clayey coarse sand matrix, becoming darker with depth. Moderately sorted. Poorly consolidated. Sharp contact.	Fluvial gravel	1.70- 2.60		-	
92030603	Dark greyish brown and greenish blue mottled silty clay. <1% gypsum flecks. <1% rootlets. Well consolidated.	Weathered London Clay	2.60- 3.50		-	
92030604	Dark greenish brown silty clay. Clast free. Well consolidated.	London Clay	3.50- 4.50+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH20307	
Coordinates (NGR) X: 559309.486		Coordinates (NGR) Y: 183825.961		Level (top): 22.105	
Length: -		Width: -		Depth: 15 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	0.00-1.70: Hand dug trial pit.	Hand dug trial pit	0.00-1.70		-
92030701	Light brownish blue coarse sandy clay. <1% fine (5mm) rounded and sub-rounded flint clasts. Moderately consolidated.	Alluvial clay	1.70-2.30		-
92030702	Dark reddish brown coarse sandy clay. <5% fine to medium (5-15mm) rounded and sub-rounded flint clasts. Moderately consolidated. Diffuse contact.	?Alluvial clay	2.70-3.00		-
92030703	Dark greenish brown silty clay. Fissured. Clast free. Well consolidated.	London Clay	3.00-3.70		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH20308	
Coordinates (NGR) X: 559563.477		Coordinates (NGR) Y: 183879.876		Level (top): 23.150	
Length: -		Width: -		Depth: 15 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	0.00-1.70: Hand dug trial pit.	Hand dug trial pit	0.00-1.70		-
92030801	Firm light grey mottled orangish brown slightly gravelly sandy clay. Sand is fine to medium. Gravel is rare sub-rounded to rounded fine flint. Diffuse contact.	?Head	1.70-1.95		
92030802	Mid yellowish brown mottled orangish brown slightly clayey gravelly fine to coarse sand. Gravel is very common sub-angular to rounded fine to medium flint. Pockets of light grey sandy clay. Diffuse contact.	Fluvial gravelly sand	1.95-2.40		
92030803	Firm dark grey brown slightly sandy slightly gravelly clay. Sand is orangish brown and fine to medium. Gravel is sparse sub-rounded to rounded fine to medium flint. Abrupt contact.	Fluvial gravelly clay	2.40-2.70		
92030804	Firm light grey mottled orangish brown slightly sandy clay. Sand is fine. Abrupt contact.	Fluvial sandy clay	2.70-2.90		
92030805	Stiff dark brownish grey clay. Common pockets of light yellowish brown fine to coarse sand and common pockets of sub-rounded to rounded fine to medium flint. Diffuse contact.	Weathered London Clay	2.90-3.50		
92030806	Stiff dark brownish grey clay. Extremely closely spaced fissures. Very rare selenite crystals.	London Clay	3.50-4.00+		

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH20309	
Coordinates (NGR) X: 559631.209		Coordinates (NGR) Y: 183913.001		Level (top): 24.049	
Length: -		Width: -		Depth: 10 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
92030901	Dark grey brown slightly sandy slightly gravelly silty clay. Sand is fine to medium. Gravel is occasional sub-angular and rounded flint clasts (<60mm). Very occasional sub-angular chalk fragments. Friable. Diffuse contact.	Ploughsoil	0.00-0.30		-
92030902	Light brown gravelly sandy clay. Sand is fine to medium. Gravel is frequent sub-angular to rounded flint clasts (<70mm). Compact. Diffuse contact.	Colluvial clay (Head)	0.30-0.60		-
92030903	Stiff light brown mottled orangish brown gravelly slightly sandy clay. Sand is fine to medium. Gravel is frequent sub-angular to rounded flint clasts (<80mm). Compact. Diffuse contact.	Colluvial clay (Head)	0.60-0.85		-
92030904	Mid orangish brown, locally mottled orangish brown slightly gravelly clayey fine to coarse sand. Gravel is frequent sub-angular to rounded flint clasts (<80mm).	Colluvial sand (Head)	0.85-1.50+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH20311		
Coordinates (NGR) X: 559635.493		Coordinates (NGR) Y: 183926.087		Level (top): 24.170		
Length: -		Width: -		Depth: 10 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
92031101	Stiff mid grey brown slightly sandy slightly gravelly silty clay. Sand is fine to medium. Gravel is sparse sub-angular to rounded flint clasts (<60mm). Common fine roots and rootlets. Compact. Abrupt contact.	Ploughsoil	0.00-0.30		-	
92031102	Very stiff mid to dark yellowish brown gravelly sandy clay. Sand is fine to medium. Gravel is common sub-angular to rounded flint clasts (<60 mm). Compact. Abrupt contact.	Subsoil	0.30-0.50		-	
92031103	Dense mid grey brown slightly clayey sandy gravel. Sand is fine to medium. Gravel is near complete sub-angular to rounded flint clasts (<80mm); well sorted. Compact. 0.90m: becomes a clayey sandy gravel.	Fluvial sand and gravel	0.50-1.00		92031101	
92031104	Mid orangish brown slightly gravelly sand with pockets of soft to firm grey clayey sand. Sand is fine to medium. Gravel is sub-angular to rounded flint clasts (<60mm). Compact. Abrupt contact.	Fluvial sand and gravel	1.00-2.30		92031102 92031103	
92031105	Light grey firm slightly gravelly clayey sand. Sand is fine. Gravel is rare sub-rounded to rounded flint clasts (<80mm). Compact. Abrupt contact	Fluvial sand and gravel	2.30-2.90		920311049 2031105	
92031106	Stiff dark brown, mottled mid grey clay. Compact.	London Clay	2.90-3.50		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH20315		
Coordinates (NGR) X: 559540.819		Coordinates (NGR) Y: 184044.229		Level (top): 26.135		
Length: -		Width: -		Depth: 10 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
92031501	Dark grey brown slightly sandy slightly gravelly silty clay. Sand is fine to medium. Gravel is occasional sub-angular to rounded flint clasts (<80mm). Frequent fine rootlets. Compact. Abrupt contact.	Topsoil/ ploughsoil	0.00- 0.30			
92031502	Mid yellowish brown firm gravelly clay. Gravel is frequent sub-angular to rounded flint clasts (<80 mm). Compact. Abrupt contact.	Colluvial clay (Head)	0.30- 0.80			
92031503	Light yellowish brown gravelly sand. Sand is fine to medium. Gravel is frequent sub-angular to rounded flint clasts (<80 mm). Compact.	Fluvial sand and gravel	0.80- 3.50		92031501	
92031504	Soft to firm brown clay. Compact.	Weathered London Clay	3.50- 3.90			
92031505	Firm dark grey fissured clay. Fissures are extremely closely to very closely spaced. Compact.	London Clay	3.90- 5.00+			

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH21301	
Coordinates (NGR) X: 558504.618		Coordinates (NGR) Y: 184144.862		Level (top): 21.050	
Length: -		Width: -		Depth: 20 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
92130101	Medium yellow brown silty clay loam.	Topsoil	0.00- 0.30		-
92130102	Medium yellow brown silty clay loam. Blocky structure.	Subsoil	0.30- 0.50		-
92130103	Orange brown slightly sandy silt. Sand is fine.	Colluvial silt (Head)	0.50- 0.90		
921030104	Orange brown sandy clay with occasional sub-rounded flint inclusions, mixed lithologies	Fluvial clay	0.90- 1.20		
921030105	Soft grey brown sandy clay, sand is fine. No visible structure in SPT.	Fluvial clay	1.20- 4.15		
921030106	Stiff grey brown clay becoming sandy clay from 5.0m.	Fluvial clay	4.15- 6.00		
921030107	Firm slightly silty yellow brown sand. Sand is fine to coarse, occasional small shell fragment (<2mm).	Fluvial sand	6.00- 8.80		-
921030108	Stiff grey silty clay. Slightly sandy. No primary structure or examinations visible in SPT's. No organic content observed.	Fluvial clay	8.80- 16.10		-
921030109	Fine sub-angular to sub-rounded flint gravel (30mm) in a stiff grey sandy silt matrix.	Fluvial sand and gravel	16.10 - 18.55		-
921030110	Stiff grey silty clay with occasional patches of yellow brown sand.	Fluvial sand	16.55- 18.00		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH21302	
Coordinates (NGR) X: 558446.411		Coordinates (NGR) Y: 184170.768		Level (top): 20.694	
Length: -		Width: -		Depth: 20 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
92130201	Firm mid grey brown slightly gravelly slightly sandy silty clay. Sand is fine. Gravel is rare sub-angular to rounded flint clasts (<60mm). Friable. Diffuse contact.	Topsoil	0.00-0.35		
92130202	Dark orangish brown slightly gravelly sandy clay. Sand is fine. Very occasional fine to medium sub-rounded to rounded flint clasts (<50mm). Friable. Diffuse contact.	Colluvial clay (Head)	0.35-0.80		92130201
92130203	Mid orange brown slightly gravelly sandy clay. Sand is fine. Very occasional fine to medium sub-rounded to rounded flint clasts (<40mm). Friable. From 2.50 m to base of deposit becomes more of a clayey sand. Diffuse contact.	Fluvial clay	0.80-2.90		921302029 2130203
92130204	Mid yellowish brown fine and medium sand. Compact.	Fluvial sand	2.90-6.00		92130204
92130205	Mid yellowish brown slightly gravelly sand. Sand is fine to medium. Occasional fine to medium sub-angular to rounded flint clasts (<60mm). More gravelly beds present throughout. Abrupt contact.	Fluvial sand	6.00-8.00		921302059 2130206
92130206	Soft dark grey silty clay. Very occasional organic pockets. Slightly micaceous. Abrupt contact.	Fluvial clay	8.00-15.00		921302079 2130208,
92130207	Stiff dark brown mottled grey clay. Compact.	London Clay	15.00-16.00+		

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH21303	
Coordinates (NGR) X: 558294.268		Coordinates (NGR) Y: 184170.274		Level (top): 19.024	
Length: -		Width: -		Depth: 20 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
92130301	Mid-dark greyish brown clayey silt. <1% sub-rounded chalk. <1% fine to medium rounded flint. Moderate rooting	Topsoil	0.00-0.45		-
92130302	Mid-light reddish brown silty clay. <1% fine flint pebbles. Becoming sandier with depth. Moderate rooting.	?Colluvial clay (Head)	0.45-1.10		-
92130303	Mid brownish red fine sandy clay. No apparent clasts. Moderately consolidated.	Fluvial clay	1.10-2.30		-
92130304	Mid brown slightly gravelly medium sand. <1% fine to medium angular and sub-angular flint clasts. 5.00m: becoming gravellier.	Fluvial sand	2.30-5.30		-
92130305	Dark blackish grey fine sandy clayey pseudo fibrous peat. Occasional wood fragments. <1% fine sub-angular and angular flint clasts. Moderately consolidated.	Organic fluvial sandy clay.	5.30-6.60		92130301
92130306	Mid greyish blue fine sandy clay. Clast free. Moderately consolidated.	Fluvial clay	6.60-9.80		-
92130307	Sands and gravels.	Fluvial sand and gravel	9.80-10.00		-
92130308	Dark greenish brown silty clay. <1% fine angular flint clasts. Well consolidated.	London Clay	10.00-20.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH21304	
Coordinates (NGR) X: 558556.025		Coordinates (NGR) Y: 184191.808		Level (top): 22.439	
Length: -		Width: -		Depth: 20 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
92130401	0.00-1.50: Hand dug trial pit.	Hand dug trial pit	0.00-1.50		-
92130402	Soft mid orangish brown clayey sand. Sand is fine. Occasional fine to medium sub-angular to rounded flint clasts. Some possible laminations. Diffuse contact.	?Fluvial sand	1.50-1.80		-
92130403	Firm mid orangish brown with a grey hue slightly sandy clay. Sand is fine. Very occasional sub-rounded medium flint gravel. Abrupt contact.	?Fluvial clay	1.80-2.80		-
92130404	Firm mid grey brown slightly sandy clay. Sand is fine to coarse. Abrupt contact.	?Fluvial clay	2.80-3.15		
92130405	Soft mid grey mottled orangish brown slightly sandy clay with pockets of light grey fine sand. Sand is fine. Extremely occasional sub-rounded fine flint clasts. Diffuse contact.	Fluvial sand	3.15-4.50		
92130406	Soft mid grey mottled orangish brown fine sandy clay. Pockets and partings of fine grained orangish brown sand. Very occasional sub-rounded to rounded fine to medium flint clasts. Diffuse contact.	Fluvial clay	4.50-6.60		
92130407	Mid grey mottled orangish brown and yellowish brown slightly gravelly silty sand. Sand is fine to coarse. Gravel is sparse sub-angular to rounded fine to medium flint. Gravelier with depth. Abrupt contact.	Fluvial sand and gravel	6.60-7.15		
92130408	Dark orangish brown mottled grey fine to medium sand. Rare pockets of dark grey clay. Clast free. Diffuse contact.	Fluvial sand	7.15-7.70		
92130409	Mid grey fine to coarse sand. Very rare very fine rounded flint gravel. Diffuse contact.	Fluvial sand	7.70-8.10		
92130410	Mid orange brown mottled grey brown slightly gravelly fine to coarse sand. Gravel is rare sub-angular to rounded fine to medium flint. Diffuse contact.	Fluvial sand and gravel	8.10-8.70		

92130411	Light grey mottled orangish brown slightly gravelly fine to coarse sand. Gravel is moderately sub-angular to rounded fine to coarse flint. Abrupt contact.	Fluvial sand and gravel	8.70-9.40		
92130412	Light grey slightly gravelly fine to medium sand. Gravel is common sub-angular to rounded fine to medium flint. Abrupt contact.	Fluvial sand and gravel	9.40-9.90		
92130413	Mid orangish brown to mid yellowish brown gravelly fine to coarse sand. Gravel is very common sub-angular to rounded fine to coarse flint with a band of medium to coarse flint at the top of the deposit.	Fluvial sand	9.90-10.80		
	10.80-12.80: No core lengths.		10.80-12.80		
92130414	Very dark grey silty clay. Locally mottled dark bluish grey. No inclusions. Extremely closely to very closely spaced planar fissures. +14.00: No core lengths.	?Fluvial clay	12.80-14.00		

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH21305	
Coordinates (NGR) X: 558637.880		Coordinates (NGR) Y: 184203.341		Level (top): 23.713	
Length: -		Width: -		Depth: 12.95 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		
	1.20-2.70: No core lengths.		1.20-2.70		
92130501	Firm yellow brown sand, occasional small clayey patches	?Fluvial sand	2.70-3.15		-
	3.15-4.70: No core lengths.		3.15-4.70		
92130502	Firm yellow brown sand, occasional small clayey patches.	?Fluvial sand	4.70-5.70		-
	5.70-6.70: No core lengths.		5.70-6.70		
92130503	Firm yellow brown sand, occasional small clayey patches.	?Fluvial sand	6.70-8.70		-
92130504	Red brown sand occasional small clayey patches. 12.10: Becoming dark red brown.	?Fluvial sand	11.70-12.30		
92130505	Firm dark grey sandy clay faint laminations.	Fluvial clay	12.30-12.54		-
92130506	Firm red brown sand, no visible structure.	?Fluvial sand	12.54-12.70		-
92130507	Dark grey brown stiff silty clay. Frequent sub-rounded flint clast and occasional organic fragments. No further core lengths available.	Fluvial clay	12.70-12.95+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH21307	
Coordinates (NGR) X: 558414.745		Coordinates (NGR) Y: 184378.860		Level (top): 21.601	
Length: -		Width: -		Depth: 20 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
92130701	Firm slightly gravelly sandy clay. Sand is fine. Gravel is sparse sub-angular to rounded flint clasts (<80mm). Friable. Abrupt contact. Frequent fine rootlets. Abrupt contact.	Topsoil	0-0.35		
92130702	Stiff dark orangish brown sandy clay. Sand is fine. Very occasional sub-rounded to rounded flint clasts (<60mm). Becoming very sandy towards base of deposit. Diffuse contact.	Subsoil	0.35-0.80		
92130703	Dark orangish brown very sandy clay. Sand is fine. From 1.10 m bgl becomes a mid-orange fine sand.	?Colluvially reworked upper part of fluvial sand	0.80-1.20+		92130701

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH21308		
Coordinates (NGR) X: 558513.528		Coordinates (NGR) Y: 184399.283		Level (top): 22.374		
Length: -		Width: -		Depth: 30 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20			
92130801	Mid orangish brown firm slightly gravelly clayey sand. Sand is fine. Gravel is fine sub-angular to rounded flint. Abrupt contact.	Fluvial sand	1.20-1.80		-	
92130802	Mid grey mottled brown slightly sandy clay. Sand is fine. Firm. Abrupt contact.	Fluvial sand	1.80-2.00		-	
92130803	Mid orangish brown sandy clay. Sand is fine to medium. Rare pockets of yellowish brown sand. Diffuse contact.	Fluvial sand	2.00-2.90		-	
92130804	Mid yellowish brown sand with rare pockets of orangish brown and grey clay. Sand is fine to medium. Diffuse contact.	Fluvial sand	2.90-3.60		-	
92130805	Mid orangish brown clayey sand. Sand is fine to medium. Diffuse contact.	Fluvial sand	3.60-4.50		-	
92130806	Light yellowish brown slightly clayey sand. Sand is fine to medium. Abrupt contact.	Fluvial sand	4.50-4.70		-	
92130807	Light grey slightly sandy clay. Sand is fine to medium. Firm. Diffuse contact.	Fluvial sand	4.70-4.85		-	
92130808	Mid yellowish brown fine to medium sand. Very rare pockets of grey clay. Diffuse contact.	Fluvial sand	4.85-5.65		-	
92130809	Mid orangish brown mottled grey brown slightly clayey fine to medium sand. Becomes clayey towards base of unit. Abrupt contact.	Fluvial sand	5.65-5.90		-	
92130810	Light grey fine to medium sand. Rare pockets of mid grey clay. Rare partings of orange brown sand.	Fluvial sand	5.90-6.50		-	
92130811	Mid grey mottled orangish brown clayey sand. Sand is fine. Abrupt contact.	Fluvial sand	6.50-6.70		-	
92130812	Mid orangish brown slightly gravelly fine to coarse sand. Gravel is fine sub-angular to rounded flint. Diffuse contact.	Fluvial sand and gravel	6.70-6.90		-	

92130813	Mid grey very gravelly fine to medium sand. Gravel is abundant fine sub-angular to rounded flint. Very rare medium flint. Diffuse contact.	Fluvial sand and gravel	6.90-7.30		-
92130814	Mid orangish brown mottled grey slightly gravelly fine to coarse sand. Gravel is frequent sub-angular to rounded fine to medium flint. Predominantly the smaller end of the fraction. Diffuse contact.	Fluvial sand and gravel	7.30-8.15		-
92130815	Mid grey gravelly fine to coarse sand. Gravel is abundant fine sub-angular to rounded flint with bands of medium flint around 9.10 m onwards. Occasional bands of orange brown gravelly sand. Diffuse contact.	Fluvial sand and gravel	8.15-11.40		-
92130816	Mid orange brown slightly gravelly clayey sand. Sand is fine. Gravel is sub-angular to rounded fine and medium flint. Abrupt contact.	Fluvial sand and gravel	11.40-12.10		-
92130817	Very dark grey slightly sandy clay. Sand is fine. Firm. Abrupt contact.	Fluvial clay	12.10-12.90		-
92130818	Mid grey clay. Occasional slightly sandy patches. Sand is fine. Firm. Abrupt contact.	Fluvial sand and gravel	12.90-13.70		-
92130819	Firm dark grey clay. Rare patches of fine sand. Abrupt contact.	Fluvial clay	13.70-15.00		-
92130820	Firm light grey slightly gravelly clay. Gravel is frequent sub-rounded to rounded fine to medium flint. Abrupt contact.	Fluvial Clay	15.00-16.40		
92130821	Dark grey firm clay.	London Clay	16.40-18.00+		

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH21309		
Coordinates (NGR) X: 557805.716		Coordinates (NGR) Y: 184509.570		Level (top): 19.133		
Length: -		Width: -		Depth: 20 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
9213091	Dark greyish brown clayey silt with occasional subangular flint clasts (<=70mm).	Topsoil	0.00-0.35		-	
9213092	Mid greyish yellow silty clay. Clast free.	?Colluvial clay (Head)	0.35-1.70		-	
9213093	Mottled mid greyish yellow clayey sand.	Fluvial sand	1.70-2.20		-	
9213094	Mottled mid yellowish grey sand.	Fluvial sand	2.20-2.60		-	
9213095	Mid grey sandy clay with occasional yellow mottling.	Fluvial clay	2.60-2.90		-	
9213096	Dark blackish grey silty clay with occasional pockets of organic material.	Fluvial silty clay	2.90-6.00		9213091	
9213097	Coarse gravelly sand. Very frequent subangular flint clasts. Clasts moderately well sorted (<60mm).	Fluvial gravelly sand	6.00-6.40		-	
9213098	Firm mid grey clay.	London Clay	6.40+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH21311	
Coordinates (NGR) X: 558448.967		Coordinates (NGR) Y: 184634.380		Level (top): 23.275	
Length: -		Width: -		Depth: 15 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
92131101	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		-
92131102	Stiff light grey brown mottled orangish brown slightly sandy gravelly silty clay. Sand is fine. Gravel is abundant sub-angular to sub-rounded fine to coarse flint. Frequent black staining (manganese?). Abrupt contact.	Fluvial gravelly clay	1.20-1.70		-
92131103	Firm mid grey mottled orangish brown thickly laminated to very thinly bedded sandy clayey silt. Sand is fine to medium. Very rare sub-rounded to rounded fine flint gravel. Towards base of unit frequent fine black specks occur. These may be manganese staining or possibly are degraded rootlets. Diffuse contact.	Fluvial sandy silt	1.70-2.70		-
92131104	Light yellowish brown mottled orangish brown thickly laminated to very thinly bedded slightly clayey fine sand. Rare pockets and bands of light grey clay. Diffuse contact.	Fluvial sand	2.70-3.90		-
92131105	Firm light to mid grey slightly sandy silty clay. Sand is fine. Unclear if this is band of clay within 92131104 as core is missing below 4.10 m (probably sampled by geotechnical engineers). A single 0.10 m diameter sub-rounded flint nodule has been left at the base of this unit.	Fluvial silty clay	3.90-4.70+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH21316	
Coordinates (NGR) X: 558262.474		Coordinates (NGR) Y: 184866.090		Level (top): 24.475	
Length: -		Width: -		Depth: 25 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
	0.00-1.20: Hand dug trial pit.	Hand dug trial pit	0.00-1.20		
92131601	Mid orangish brown clayey fine to medium sand. Rare partings of light whitish grey fine sand. Friable. Contact unclear as core missing between 1.70 and 2.50 mbgl.	?Colluvial sand (Head)	1.20-1.70		-
92131602	Mid orange brown sandy clay. Rare partings of light grey fine to medium sand. Sand is fine to medium. Diffuse contact.	Fluvial clay	2.50-3.00		-
92131603	Mid orangish brown clayey fine to medium sand. Rare pockets of light grey fine sand. Diffuse contact.	Fluvial sand	3.00-3.50		-
92131604	Mid orangish brown slightly sandy clay. Sand is fine. Contact missing as core sampled between 3.75 and 5.05.	Fluvial clay	3.50-3.75		-
92131605	Light grey brown with a mid-orangish hue clayey fine to medium sand. Diffuse contact.	Fluvial sand.	4.30-5.05		-
92131606	Mid orangish brown slightly clayey fine to medium sand. Locally mid grey fine sandy clay. Locally thin bands of coarse sand. Contact missing as core sampled between 7.80-9.90m.	Fluvial sand.	5.05-7.80		-
92131607	Mottled light brown and light orange brown slightly gravelly fine to coarse sand. Gravel is common sub-rounded to rounded fine to medium flint.	Fluvial sand.	8.50-9.90		-
	9.90-10.60: Core loss.		9.90-10.60		
92131608	Light brown slightly gravelly fine to coarse sand. Gravel is rare sub-rounded to rounded fine to coarse flint. Abrupt contact.	Fluvial sand	10.60-11.08		-
92131609	Light grey mottled orangish brown slightly gravelly fine to medium sand. Gravel is sparse sub-rounded to rounded fine to medium flint, becomes more common towards base of the unit. Abrupt contact.	Fluvial sand	11.08-11.80		-
-92131610	Sand is fine coarse. Gravel is near complete fine to medium sub-angular to rounded flint, predominantly fine.	Fluvial gravel	11.80-12.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH21319	
Coordinates (NGR) X: 558426.219		Coordinates (NGR) Y: 185086.057		Level (top): 25.872	
Length: -		Width: -		Depth: 13.50 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
92131901	Firm dark brown slightly sandy slightly gravelly clay. Frequent rootlets. Sand is fine to medium. Gravel is sparse fine to medium sub-angular to rounded flint. Abrupt contact.	Topsoil	0.00-0.30		-
92131902	Stiff brown slightly sandy slightly gravelly clay with pockets of orangish brown fine and medium sandy clay. Sand is fine to medium. Gravel is fine to medium sub-angular to rounded flint. Abrupt contact.	Subsoil	0.30-0.55		-
92131903	Stiff light greyish brown and orangish brown slightly sandy clay. Sand is fine to medium. Diffuse contact.	?Colluvial clay (Head)	0.55-1.90		-
92131904	Firm orangish brown sandy clay. Sand is fine to medium. Occasional thin bands of fine and medium orangish brown slightly clayey sand. Diffuse contact.	Fluvial clay	1.90-4.30		-
92131905	Yellowish brown slightly clayey fine and medium sand. Diffuse contact.	Fluvial sand	4.30-8.20		
92131906	Yellowish brown slightly gravelly becoming gravelly fine to coarse sand. Gravel is common sub-angular to rounded fine to coarse flint. From 8.90-9.40m bgl pockets of clay. Diffuse contact.	Fluvial sand	8.20-9.40		-
92131907	Soft slightly sandy slightly gravelly grey clay. Sand is fine to coarse. Gravel is sparse sub-angular to rounded fine to coarse flint. Abrupt contact.	Fluvial clay	9.40-10.60		-
92131908	Yellowish brown slightly gravelly fine to coarse sand. Gravel is moderate sub-angular to rounded fine to coarse flint. Abrupt contact.	Fluvial sand	10.60-11.40		
92131909	Stiff bluish grey with orange brown staining clay. Rare rootlet tracks. Diffuse contact.	London Clay.	11.40-11.90		-
92131910	Very stiff dark grey clay. Rare light grey silt partings. Very rare selenite crystals.	London Clay	11.90-12.50+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH21324		
Coordinates (NGR) X: 558444.969		Coordinates (NGR) Y: 185229.139		Level (top): 26.762		
Length: -		Width: -		Depth: 20 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
92132401	Dark grey brown slightly sandy slightly gravelly silty clay. Sand is fine. Gravel is rare sub-angular to rounded fine to coarse flint. Frequent rootlets. Diffuse contact.	Topsoil	0.00- 0.20		-	
92132402	Light to mid grey slightly sandy slightly gravelly silty clay. Sand is fine. Gravel is moderate sub-angular to rounded fine to coarse flint clasts. Diffuse contact.	Subsoil	0.20- 0.35		-	
92132403	Light brownish grey and orangish brown slightly gravelly sandy clay. Sand is fine to medium. Gravel is moderate sub-rounded to rounded fine to coarse flint. Rare black rootlets. Very stiff.	?Colluvial clay (Head)	0.35- 1.60		92132401	
92132404	Firm orangish brown slightly sandy becoming sandy clay. Rare bands of fine and medium sand. Diffuse contact.	Fluvial clay	1.60- 4.80			
92132405	Yellowish brown clayey fine to medium sand. Diffuse contact.	Fluvial sand	4.80- 7.60		92132402	
92132406	Mid orangish brown clayey fine to medium sand. Diffuse contact.	Fluvial sand	7.60- 8.70		92132403	
92132407	Mid yellowish grey slightly gravelly slightly clayey sand. Gravel is sparse sub-angular to sub-rounded fine and medium flint.	Fluvial sand	8.70- 10.20+		92132404	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH21326	
Coordinates (NGR) X: 558239.471		Coordinates (NGR) Y: 185265.410		Level (top): 24.210	
Length: -		Width: -		Depth: 25 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
92132601	Mid greyish brown sandy silt. Frequent fine sub-rounded flint clasts. Rooted	Topsoil	0.00-0.35		-
92132602	Mid reddish brown slightly gravelly sandy clay. Fine and medium sand. Gravel fine sub-angular flint.	Colluvial clay (Head)	0.35-0.70		-
92132603	Mid reddish brown sandy clay. Fine and medium sand.	?Fluvial clay	0.70-4.90		-
92132604	Mid yellowish brown silty sand. Fine to medium sand.	Fluvial sand	4.90-7.50		-
92132605	Light yellowish grey sandy clay. Fine to medium sand. Occasional fine sub-angular flint clasts.	Fluvial clay	7.50-10.30		-
92132606	Dense brownish grey sandy clay.	London Clay	10.30-11.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH21331	
Coordinates (NGR) X: 557938.277		Coordinates (NGR) Y: 185494.995		Level (top): 18.396	
Length: -		Width: -		Depth: 10 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
9213311	Dark brown silty clay. Firm compaction. Occasional fine sub-angular flint clasts and chalk flecks. Diffuse contact.	Topsoil	0.00-0.10		-
9213312	Mid grey brown silty clay. Diffuse contact.	Subsoil	0.10-0.45		-
9213313	Mid yellowish grey clay occasional manganese flecks.	Colluvial clay (Head)	0.45-3.00		-
9213314	Dense dark grey clay.	London Clay	3.00-5.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH21332	
Coordinates (NGR) X: 558094.608		Coordinates (NGR) Y: 185609.751		Level (top): 19.038	
Length: -		Width: -		Depth: 20 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
9213321	Dark brown silty clay. Occasional fine sub-angular flint clasts. Abrupt contact.	Topsoil	0.00- 0.15		-
9213322	Dark grey brown silty clay. Abrupt contact.	Subsoil	0.15- 0.40		-
9213323	Yellowish red brown clay.	Colluvial clay (Head)	0.40- 3.10		-
9213324	Dark yellowish brown dense clay. Dark grey clay from 3.80m.	London Clay	3.10- 11.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH21359	
Coordinates (NGR) X: 558641.462		Coordinates (NGR) Y: 187794.628		Level (top): 31.818	
Length: -		Width: -		Depth: 15 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
92135901	Dark grey brown slightly gravelly slightly sandy soft silty clay. Sand is fine to medium. Gravel is occasional sub-angular to rounded flint clasts <10 cm. Occasional post-industrial tin glazed pottery (not retained). Friable. Diffuse contact.	Topsoil	0.00-0.35		-
92135902	Light grey brown slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is frequent angular to sub-rounded flint clasts (<80mm). Rare brick fragments. Rare glass. Friable.	Made ground. From road or rail construction	0.35-0.45		-
92135903	Concrete. Recovered as angular fragments. Sharp contact.	Made ground. From road or rail construction	0.45-0.80		-
92135904	Very dark grey slightly gravelly clayey sand. Sand is fine to coarse. Gravel is rounded flint (<60mm). Friable. Abrupt contact. Indurated with cement. Rare brick fragments.	Made ground	0.80-1.90		-
92135905	Mid to dark brown slightly gravelly firm clay. Gravel is frequent sub-angular to rounded flint clasts (<60mm). Contains fragments of brick, glass, concrete, wood and plastic.	Made ground	1.90-15.80		-
92135906	Firm mid orange clay with grey mottles.	London Clay	15.80-17.00+		-

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: BH21378	
Coordinates (NGR) X: 558551.93		Coordinates (NGR) Y: 184810.594		Level (top): 26.641	
Length: -		Width: -		Depth: 15 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
92137801	Soft mid to dark grey brown very slightly gravelly slightly sandy clay. Sand is fine. Gravel is very occasional sub-angular to rounded flint clasts (<60mm). Friable. Abrupt contact.	Topsoil	0.00- 0.30		
92137802	Soft mid orangish grey brown very slightly gravelly sandy clay. Sand is fine to medium. Gravel is occasional sub-rounded to rounded flint clasts (<60mm). Friable. Abrupt contact.	Fluvial clay	0.30- 1.00		92137801
92137803	Soft mid orangish brown sandy clay. Sand is fine to medium. Friable. Rare partings of dark brown sandy clay. Abrupt contact.	Fluvial clay	1.00- 2.80		92137802
92137804	Mid yellowish brown sandy clay. Very occasional partings of grey sand. Sand is fine. Friable. Abrupt contact.	Fluvial clay	2.80- 7.70		921378039 2137804
92137805	Mid yellowish brown clayey fine sand. Abrupt contact	Fluvial sand	7.70- 8.40		92137805
92137806	Soft to firm grey clay. Laminated. Abrupt contact.	Fluvial clay	8.40- 8.70		
92137807	Mid orange brown fine sand. Bands (up to 0.15 m thick) of mid grey clay. Sand becomes coarser towards base of unit. Abrupt contact.	Fluvial sand	8.70- 10.60		92137806
92137808	Dark orange brown sandy sub-angular to rounded flint gravel (<60mm). Sand is fine to coarse. Towards base transitions to a gravelly fine to coarse grained sand. Abrupt contact.	Fluvial sand and gravel	10.60- 12.40		92137807
92137809	Stiff dark grey mottled orangish brown clay, locally laminated. Rare tubular forams.	London Clay	12.40- 13.50+		

Site Code:	Site Name:	Borehole ID:
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219246		Lower Thames Crossing Phase 3 - GI monitoring	WS18300			
Coordinates (NGR) X: 561357.459		Coordinates (NGR) Y: 183907.002	Level (top): 5.797			
Length: -		Width: -	Depth: 5 m			
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
91830001	Dark grey brown slightly sandy slightly gravelly silty clay. Sand is fine to medium. Gravel is occasional sub-angular to rounded flint clasts (<60mm). Compact. Abrupt contact.	Topsoil	0.00-0.30		-	
91830002	Dark orange brown gravelly firm silty clay. Gravel is frequent sub-angular to rounded flint clasts (<60mm). Abrupt contact.	Colluvial clay (Head)	0.30-0.80		-	
91830003	Firm dark brown clay with grey mottles.	London Clay	0.80-1.20+		-	

Site Code:	Site Name:	Borehole ID:
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219246		Lower Thames Crossing Phase 3 - GI monitoring	WS21302			
Coordinates (NGR) X: 558762.602		Coordinates (NGR) Y: 184242.112	Level (top): 24.798			
Length: -		Width: -	Depth: 5 m			
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
82130201	Stiff dark brown with a reddish hue slightly sandy slightly gravelly silty clay. Sand is fine to coarse. Gravel is occasional sub-angular to rounded flint clasts (<80mm). Compact. Diffuse contact.	Ploughsoil	0.00-0.35		-	
82130202	Dark orangish brown, locally greyish brown stiff slightly sandy slightly gravelly clay. Sand is fine to coarse. Gravel is occasional sub-angular to rounded flint clasts (<80mm). Compact. Abrupt contact.	Colluvial clay (Head)	0.35-1.60		-	
82130203	Soft light grey brown slightly sandy clay. Mottled orangish brown and locally black. Occasional laminations of orangish brown sand. Sand is fine to coarse. Very rare sub-rounded to rounded flint clasts (<60mm). Compact. 3.00: becomes a very soft sandy clay. 4.00: pockets of thin laminations of organic material. 4.90: band of clean sand.	Fluvial clay	1.60-5.00+		-	

Site Code:	Site Name:	Borehole ID:
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219246		Lower Thames Crossing Phase 3 - GI monitoring	WS21307			
Coordinates (NGR) X: 558992.288		Coordinates (NGR) Y: 186703.345	Level (top): 7.754			
Length: -		Width: -	Depth: 20 m			
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
82130701	Mid brown sandy silty clay. Fine sand component. Rooted. Stiff. Occasional fine chalk flecks. Occasional fine sub-angular flint clasts. Diffuse contact	Topsoil	0.00- 0.30		-	
82130702	Brownish grey slightly sandy clay. Fine sand component. Rootlets. Occasional fine sub-angular and sub-rounded flint clasts. Occasional chalk flecks. Diffuse contact.	Subsoil	0.30- 0.80		-	
82130703	Light brownish grey slightly sandy clay. Fine sand component. Occasional small sub-angular and very occasional sub-rounded flint clasts.	Colluvial clay (Head)	0.80- 1.20+		-	

Site Code:	Site Name:	Borehole ID:
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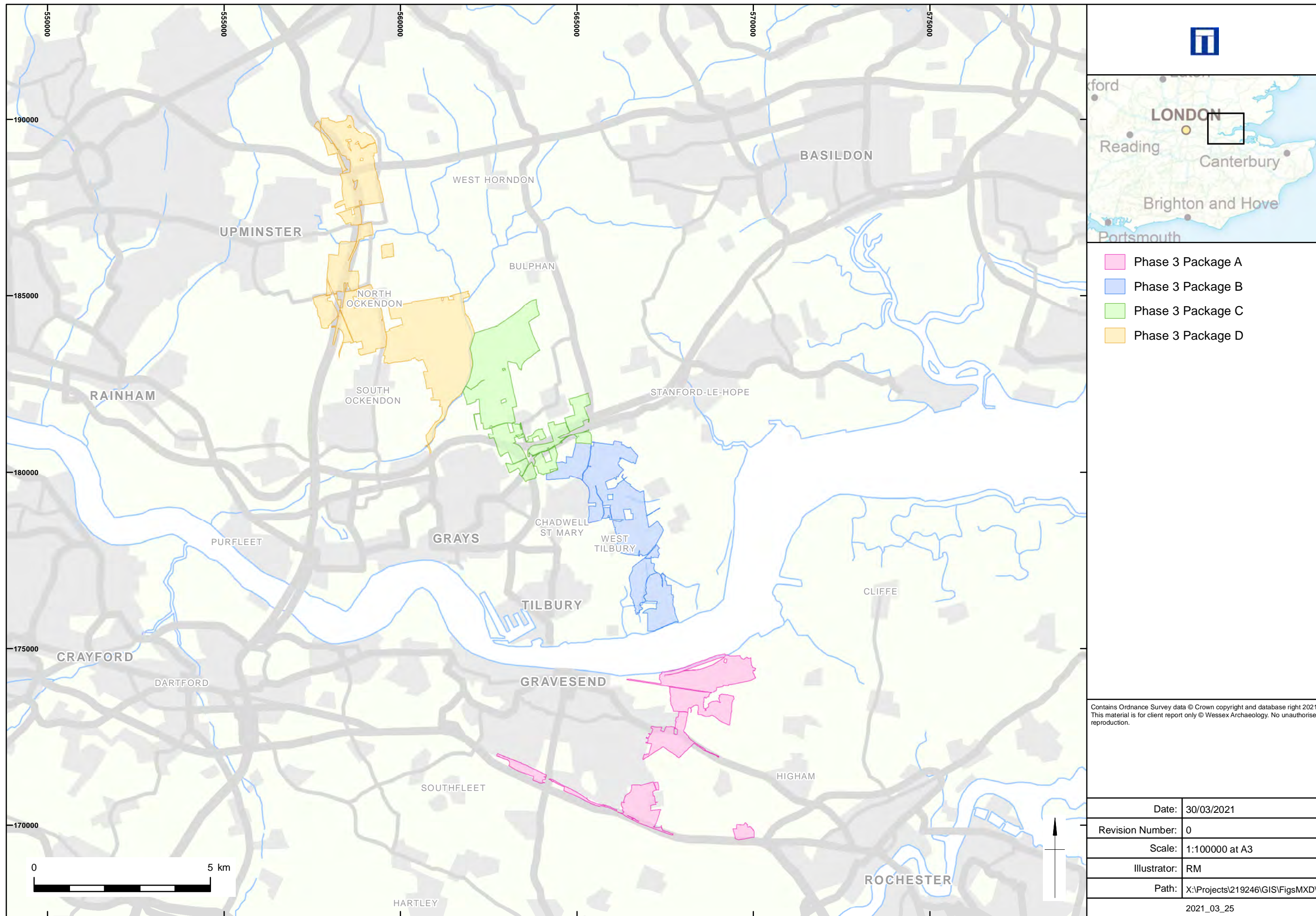
219246		Lower Thames Crossing Phase 3 - GI monitoring	WS21308			
Coordinates (NGR) X: 559074.069		Coordinates (NGR) Y: 186718.789		Level (top): 7.471		
Length: -		Width: -		Depth: 5 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
82130801	Mid brown sandy silty clay. Fine sand component. Rooted. Stiff. Very occasional fine chalk flecks poorly sorted. Very occasional fine sub-angular flints clasts. Diffuse contact.	Topsoil	0.00-0.30		-	
82130802	Subsoil. Light brownish grey slightly sandy clay. Fine sand component. Rootlets. Occasional fine sub-angular and sub-rounded flint clast. Occasional chalk flecks. Diffuse contact.	Subsoil	0.30-0.60		-	
82130803	Light brownish grey slightly sandy clay. Fine sand component. Occasional fine sub-angular flints and very occasional fine sub-rounded flint clasts. Diffuse contact.	Colluvial clay (Head)	0.60-0.80		-	
82130804	Light greyish brown slightly sandy clay. Fine sand. Frequent fine sub-angular and sub-rounded flint clasts. Medium gravel at base. Diffuse contact.	Colluvial clay (Head)	0.80-1.00		-	
82130805	Pale brownish slightly sandy clay. Fine sand. Very occasional chalk flecks throughout. Stiff.	Weathered London Clay	1.00-1.20		-	
82130806	Mid brownish bluish grey clay. Very stiff.	London Clay	1.20-2.00		-	
82130807	Light brown bluish grey clay. Very stiff. Selenite crystals <2mm.	London Clay	2.00-3.00		-	
82130808	Mid brown bluish grey clay. Very stiff. Clay stone (150mm) at 3.2m bgl.	London Clay	3.00-4.00		-	
82130809	Mid greyish brown clay. Very stiff. Fissures closely spaced. Occasional orange staining.	London Clay	4.00-5.00		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: WS21315		
Coordinates (NGR) X: 558831.036		Coordinates (NGR) Y: 187566.104		Level (top): 13.410		
Length: -		Width: -		Depth: 5 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
82131501	Mid to dark grey silty gravel. Gravel is near complete angular to rounded flint clasts (<10mm). Rare brick cobbles. Compact. Abrupt contact.	Made ground.	0.00-0.90		-	
82131502	Dark grey slightly clayey gravelly sand. Frequent sub-angular to rounded flint clasts (<8cm). Rare sub-angular cobbles of brick and concrete. Compact. Abrupt contact.	Made ground	0.90-1.40		-	
82131503	Soft to firm slightly gravelly grey clay, locally very dark grey. Rare pockets of black organic material. Gravel is occasional sub-rounded to rounded flint clasts (40 mm). Compact. 2.00-2.35: black organic clay. Abrupt contact.	Alluvial clay	1.40-3.15		-	
82131504	Black very soft organic matter. Abrupt contact.	?Peat	3.15-3.25		-	
82131505	Very soft to soft light brownish grey clay. Compact. Abrupt contact.	?Weathered London Clay	3.25-3.80		-	
82131506	Soft to firm mid brown fissured clay.	London Clay	3.80-5.00+		-	

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: WS21316	
Coordinates (NGR) X: 558806.122		Coordinates (NGR) Y: 187797.482		Level (top): 13.098	
Length: -		Width: -		Depth: 3 m	
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples
82131601	Dark grey brown slightly sandy slightly gravelly silty clay. Sand is fine to medium. Gravel is occasional sub-angular to rounded flint clasts (<60mm). Friable. Abrupt contact.	Topsoil	0.00-0.30		-
82131602	Very stiff slightly sandy slightly gravelly brown clay. Sand is fine to medium. Occasional sub-rounded chalk fragments. Very occasional sub-angular to rounded flint clasts (<60mm). Compact. Abrupt contact.	Colluvial clay (Head)	0.30-1.30		-
82131603	Soft to firm grey mottled orangish brown and brown clay with fragments of organic matter (30mm by 100mm). Friable. Diffuse contact.	Alluvial clay	1.30-2.20		-
82131604	Firm to stiff brown mottled bluish grey, locally orangish brown fissured clay. Compact.	London Clay	2.20-3.00+		-

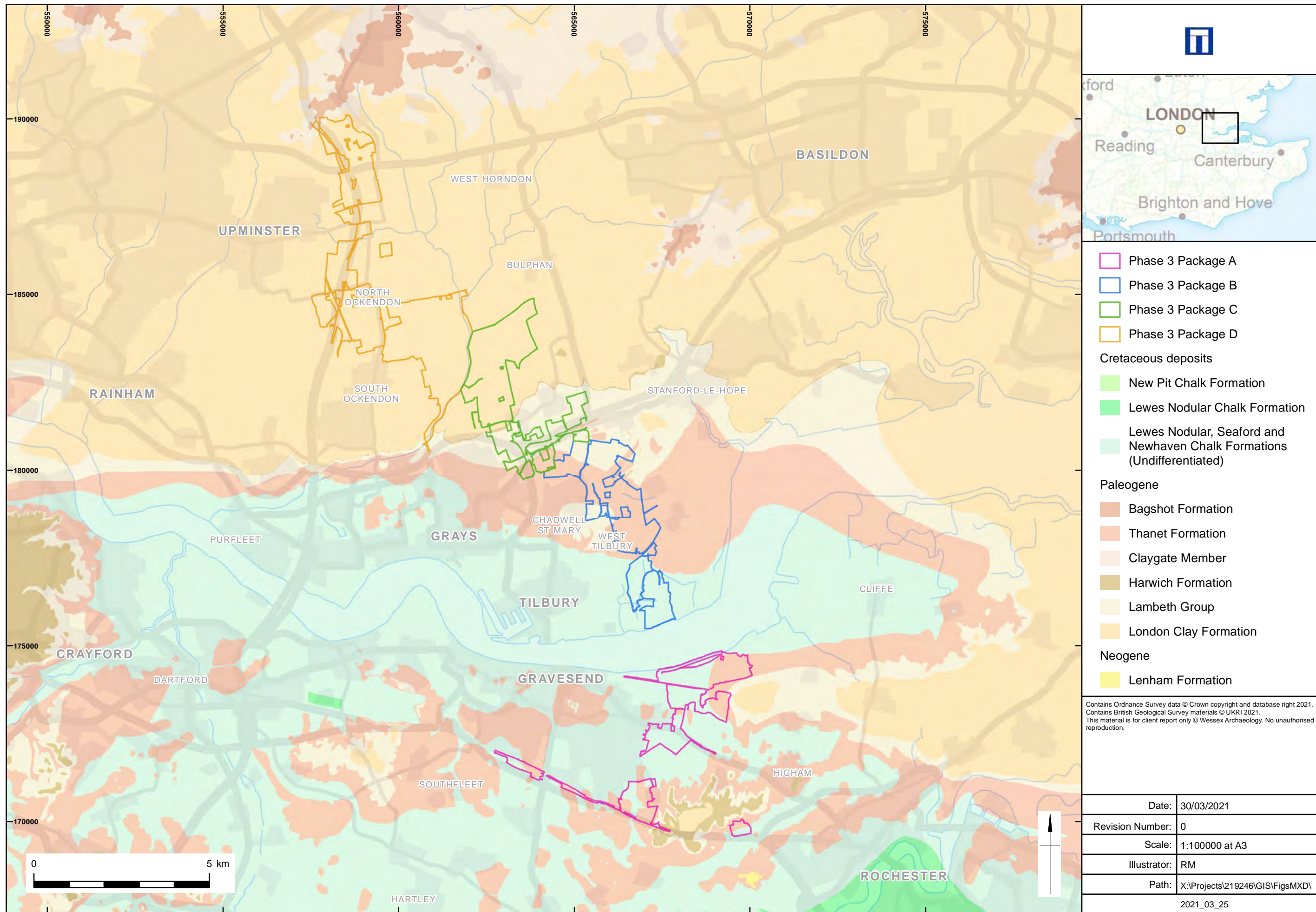
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Coordinates (NGR) X: 558676.661		Coordinates (NGR) Y: 188579.535		Level (top): 33.449		
Length: -		Width: -		Depth: 5 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
82132001	Tarmacadam. Very compact. Sharp contact.	Yard surface	0.00- 0.16		-	
82132002	Dark grey coarse silty gravel of schist. Compact. Sharp contact.	Made ground	0.16- 0.23			
82132003	Dark black tarmacadam. Very compact. Sharp contact.	Former yard surface	0.23- 0.28			
82132004	Silty sandy light brown and brownish grey fine to coarse gravel of brick, concrete, tarmac and occasional flint clasts. Compact. Abrupt contact.	Made ground	0.28- 0.55			
82132005	Very dark grey to black silty sandy angular to sub-rounded fine to coarse gravel of granite, clinker, schist and occasional flint. Compact. Abrupt contact.	Made ground	0.55- 0.80			
82132006	Stiff brown locally mottled orangish brown clay with occasional orangish brown silt partings.	London Clay	0.80- 1.50+			

Site Code: 219246		Site Name: Lower Thames Crossing Phase 3 - GI monitoring		Borehole ID: WS21328		
Coordinates (NGR) X: 558555.627		Coordinates (NGR) Y: 188891.363		Level (top): 28.636		
Length: -		Width: -		Depth: 5 m		
Context Number	Description	Interpretation	Depth m BGL	Depth m aOD	Samples	
82132801	Dark grey brown soft slightly gravelly silty clay. Gravel is occasional sub-rounded to rounded flint clasts (<60mm). Friable. Abrupt contact.	Topsoil	0.00- 0.30		-	
82132802	Mid to dark orange brown soft slightly sandy silty clay. Sand is fine to medium. Rare partings of white calcareous material degrading to sand. Friable. Diffuse contact.	Colluvial clay (Head)	0.30- 0.95		-	
82132803	Dark orange brown soft slightly sandy gravelly silty clay. Sand is fine to coarse. Gravel is frequent sub-angular to rounded flint clasts (<100mm). Predominantly fine gravel. Rare partings of white calcareous material degrading to sand. Compact. Abrupt contact.	Colluvial clay (Head)	0.95- 1.25		-	
82132804	Dark brown mottled mid grey firm fissured clay. Very occasional lithorelicts. Extremely occasional sub-rounded ironstone <0.01 m. Occasional sub-rounded to rounded calcareous siltstone <0.02 m. Compact.	London Clay	1.25- 5.00+		-	



Phase 3 Package locations

Figure 1

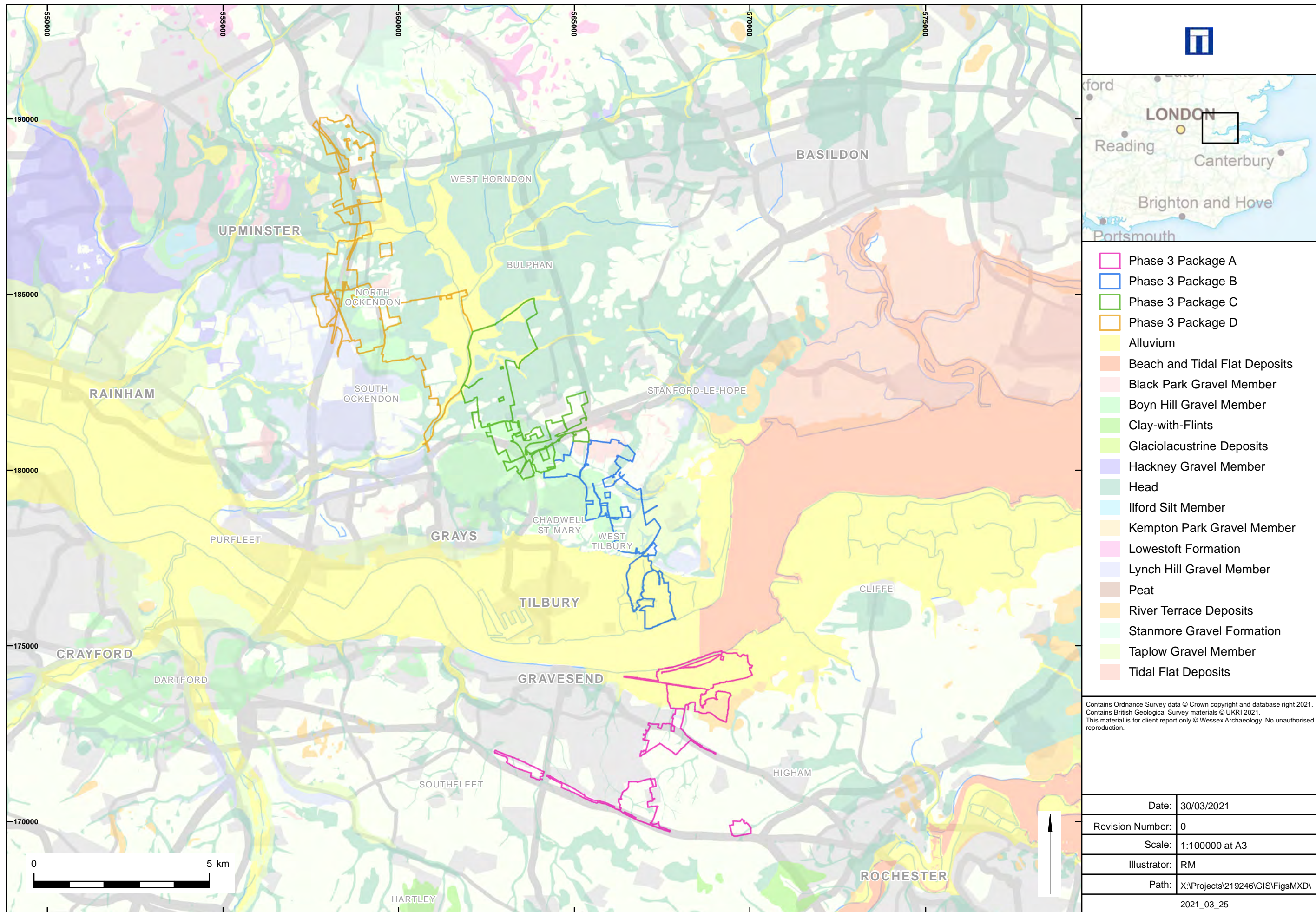


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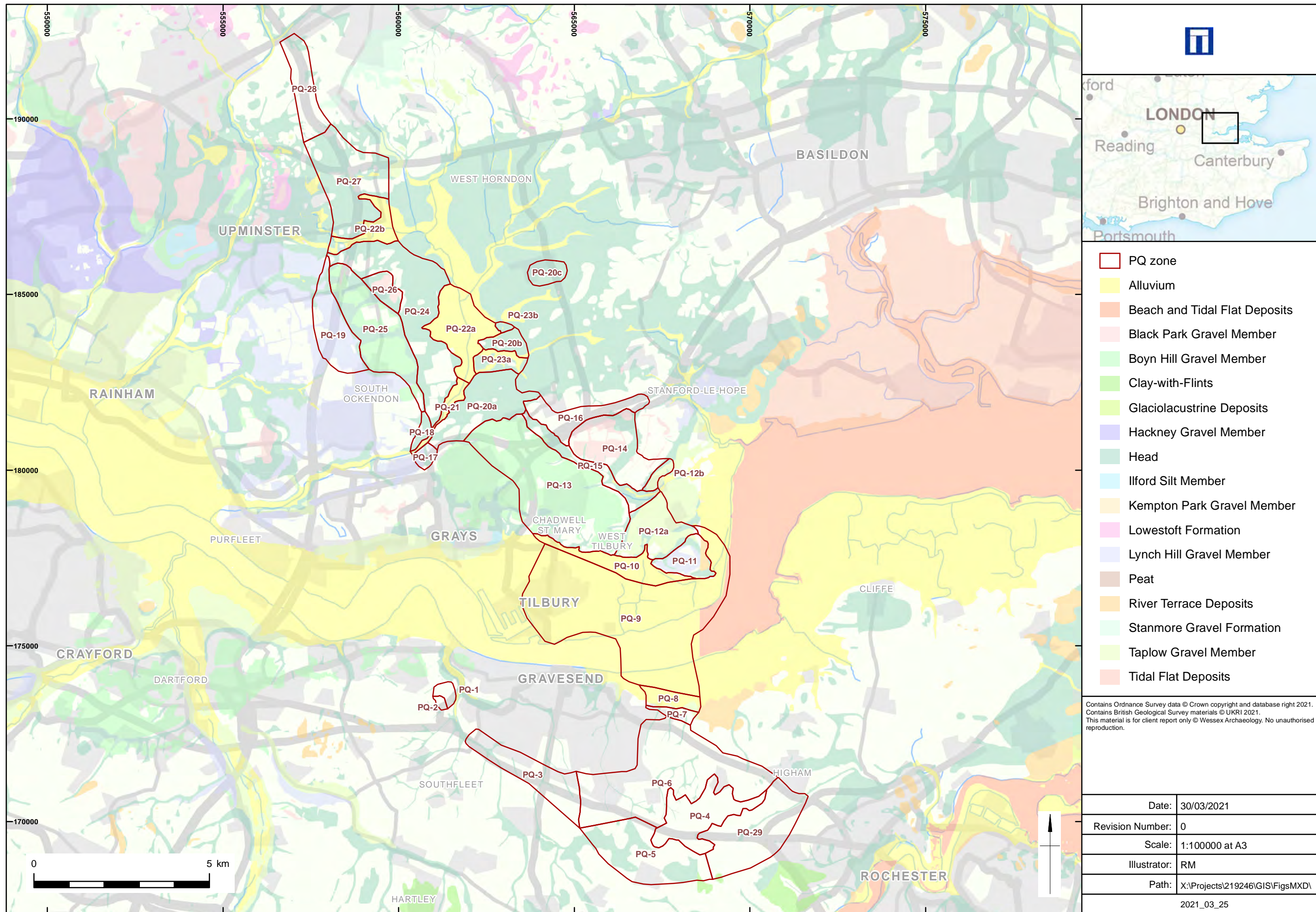
Solid geology

Figure 2



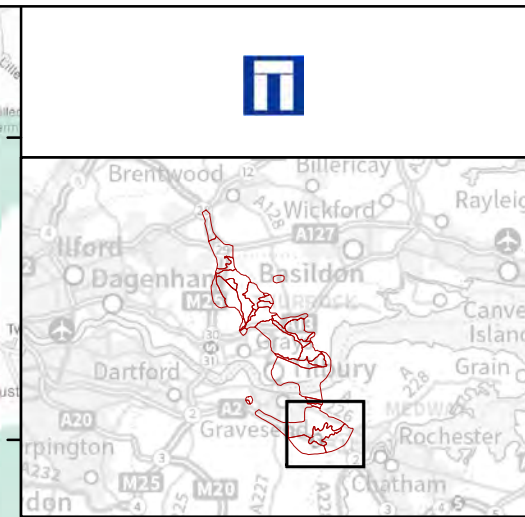
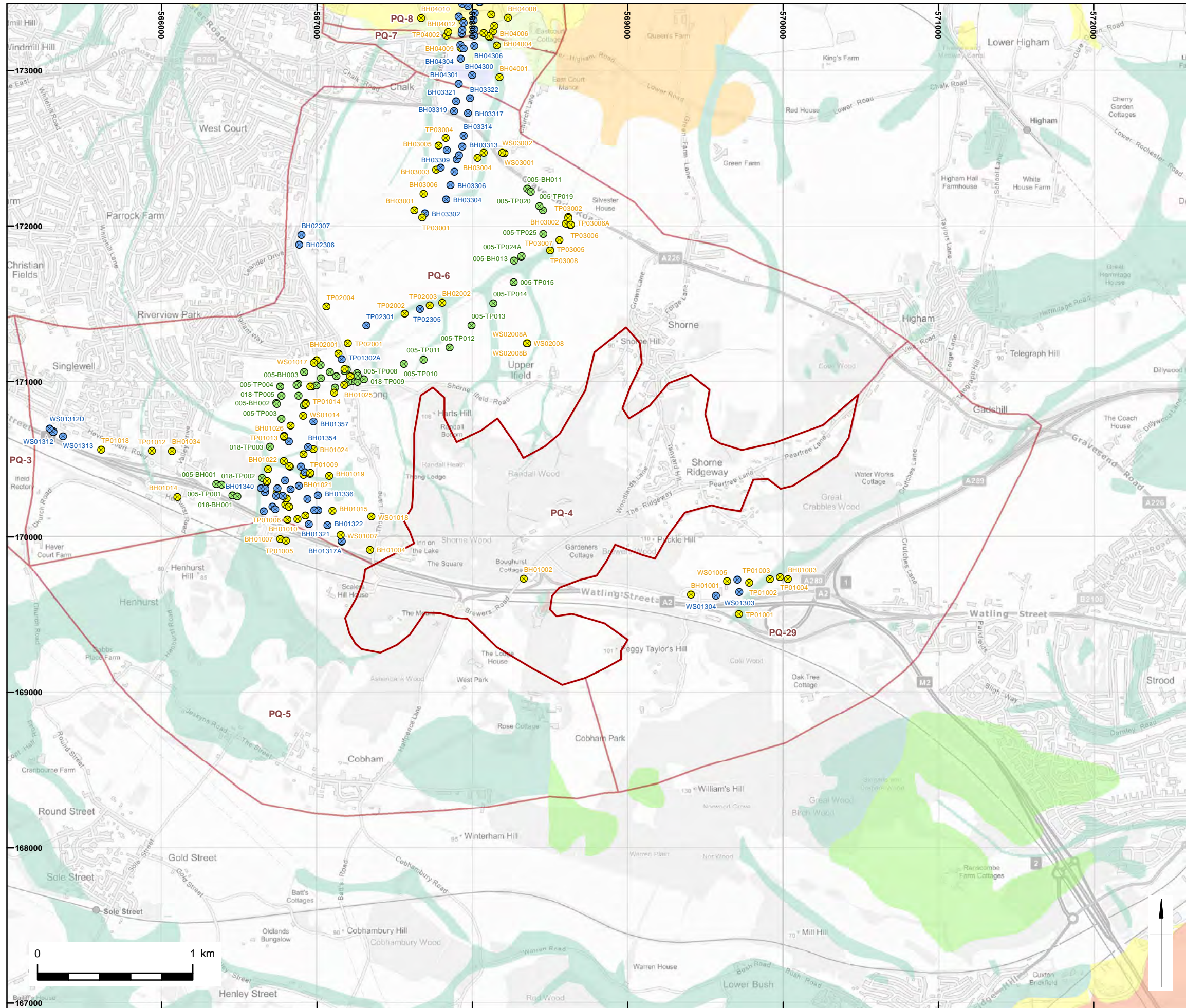
Superficial geology

Figure 3



PQ zones overlain against superficial geology

Figure 4



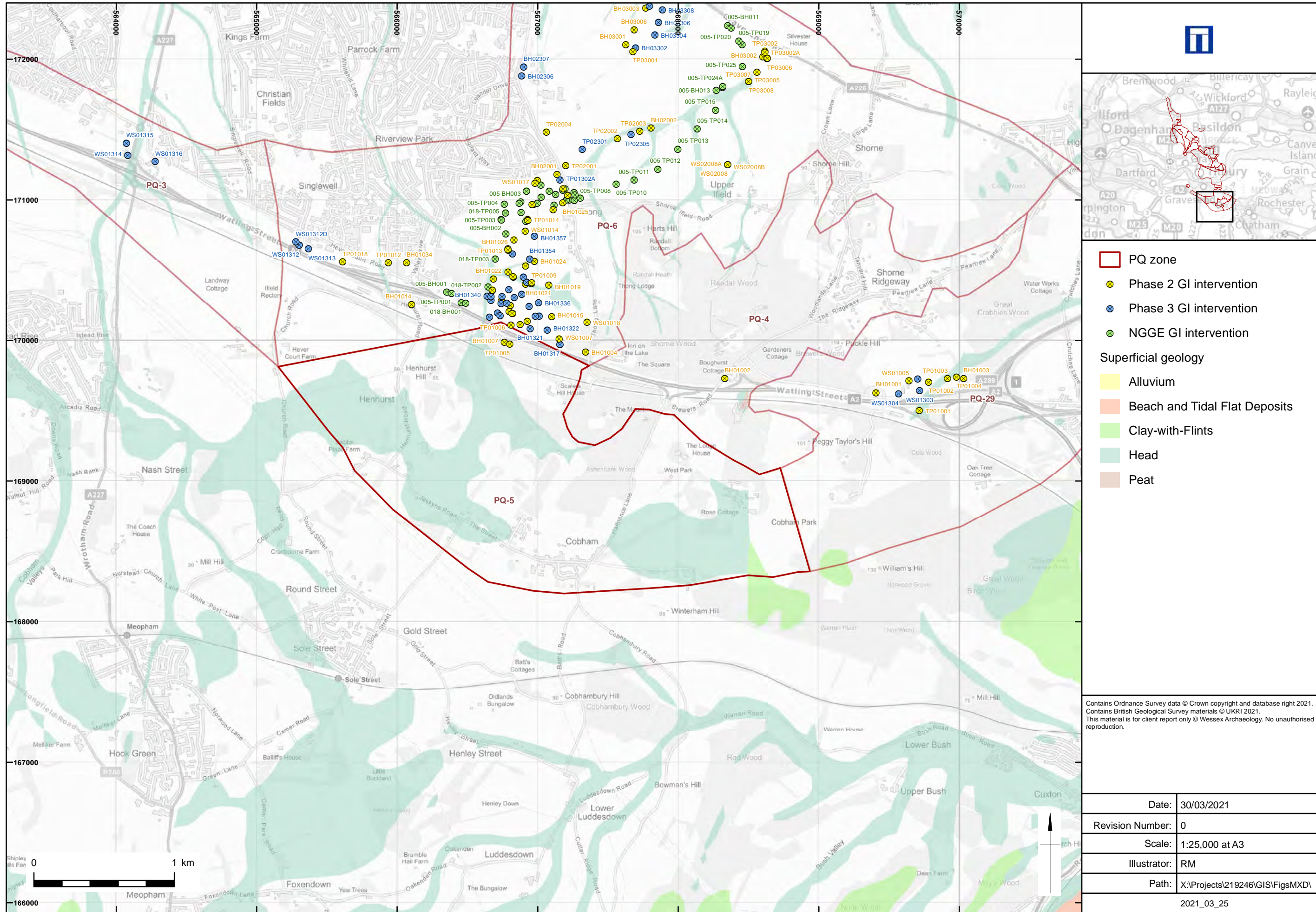
- PQ zone
 - Phase 2 GI intervention
 - Phase 3 GI intervention
 - NGGE GI intervention
- Superficial geology
- Alluvium
 - Beach and Tidal Flat Deposits
 - Clay-with-Flints
 - Head
 - Lynch Hill Gravel Member
 - Peat
 - River Terrace Deposits
 - Taplow Gravel Member

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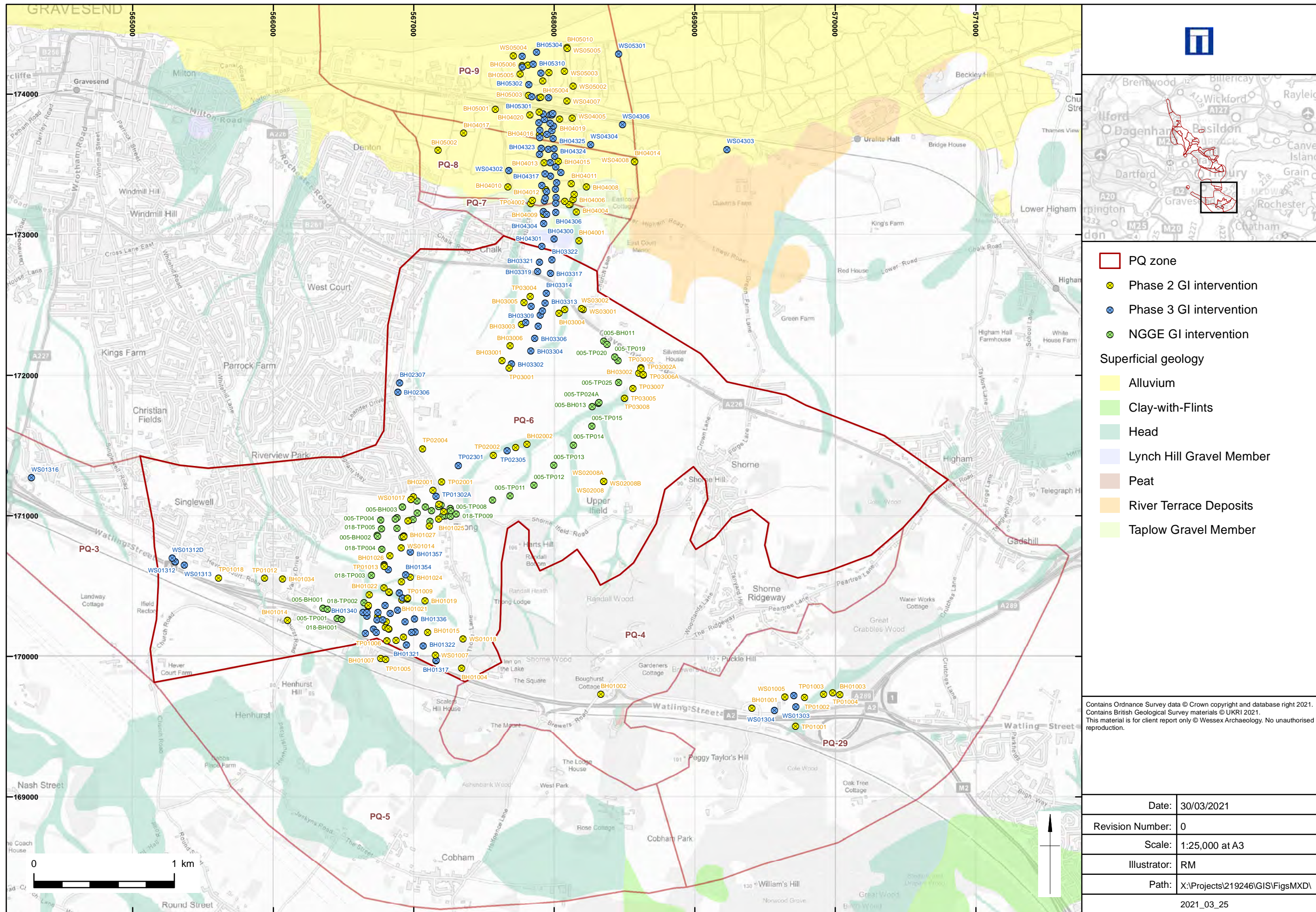
Plan of PQ Zone 4

Figure 6



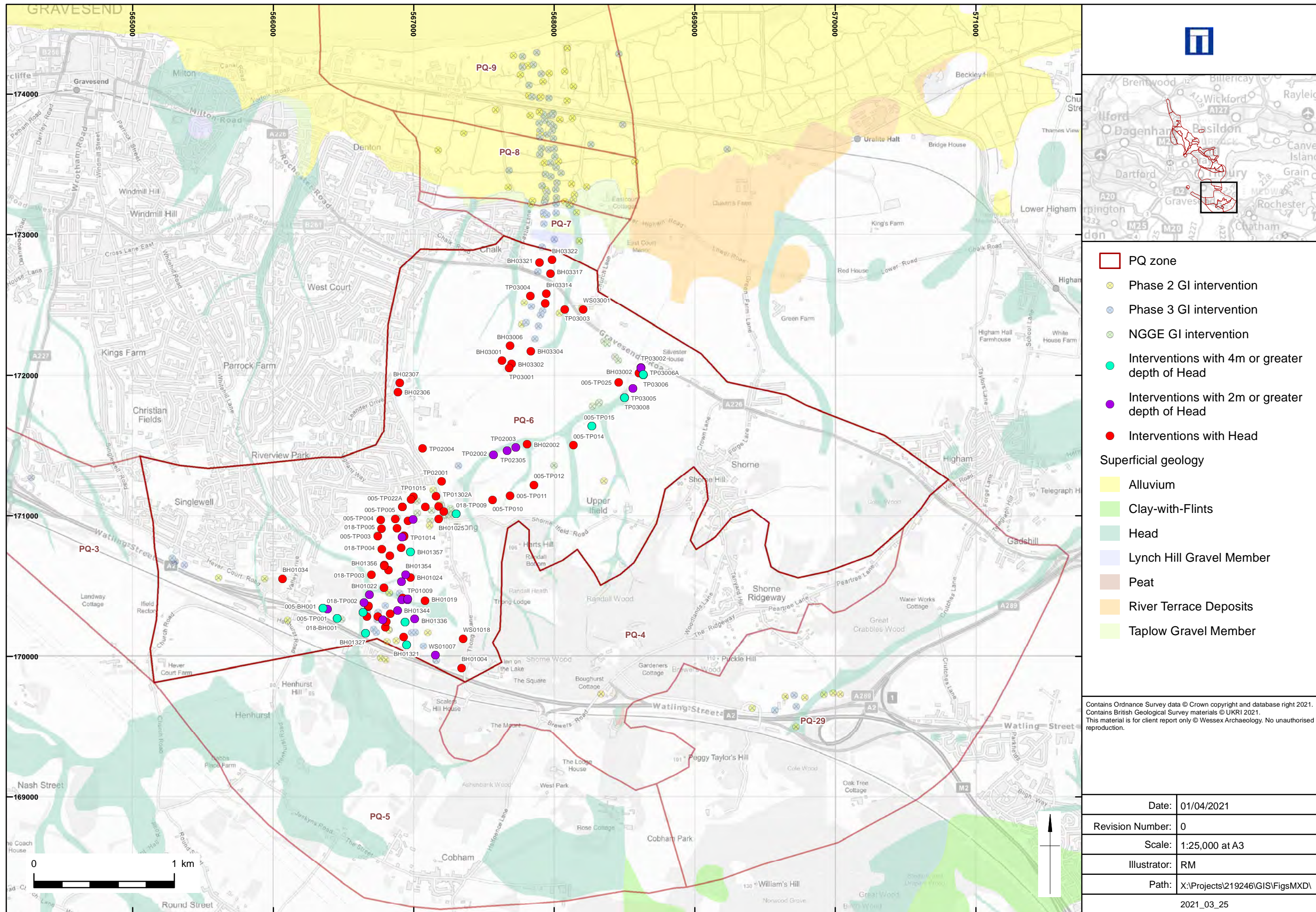
Plan of PQ Zone 5

Figure 7



Plan of PQ Zone 6

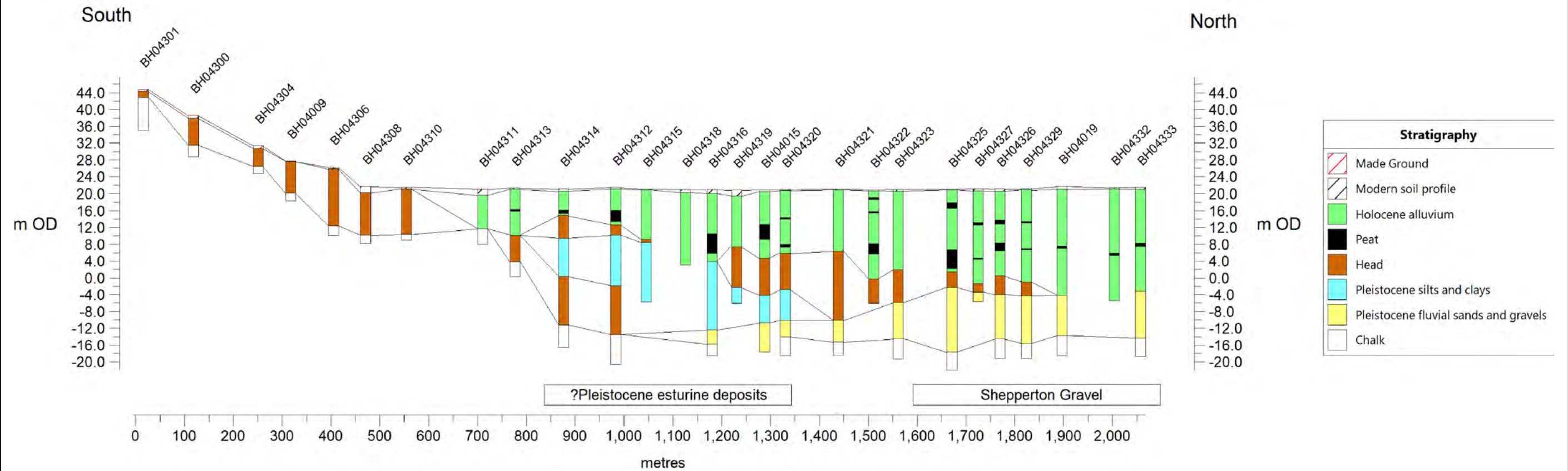
Figure 8



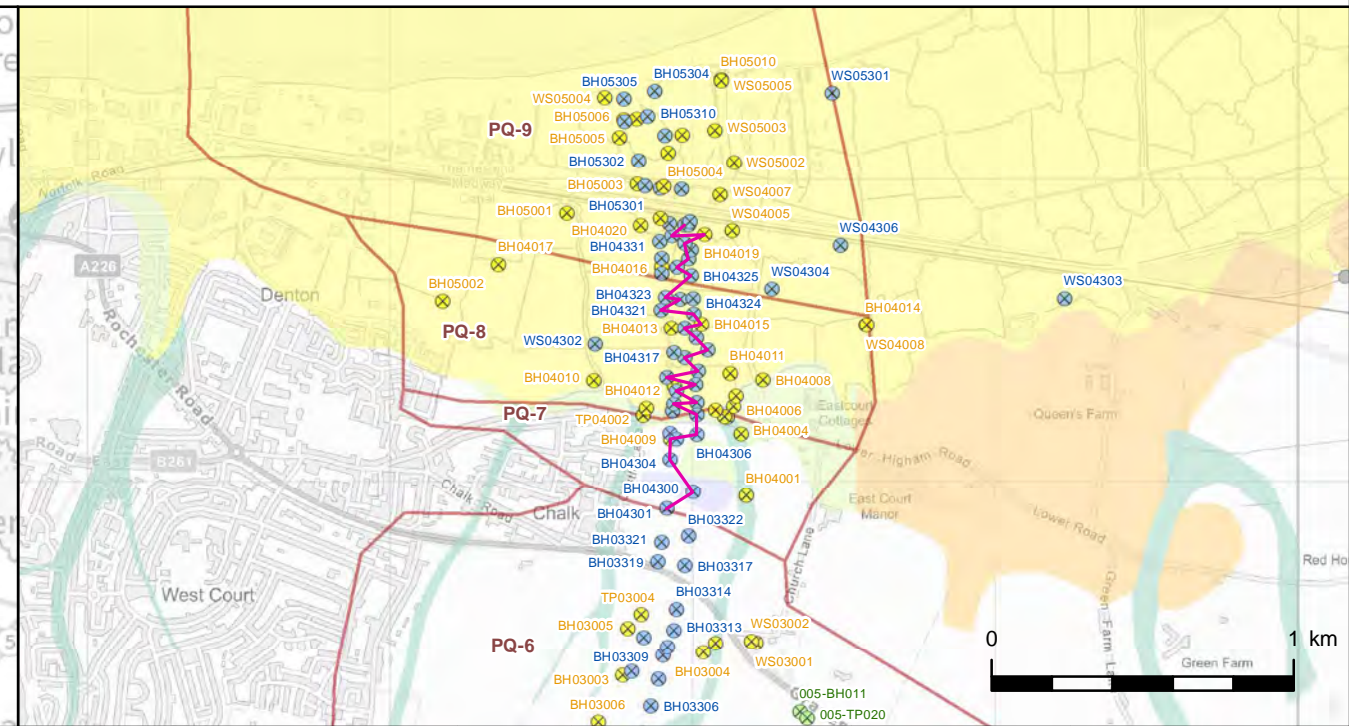
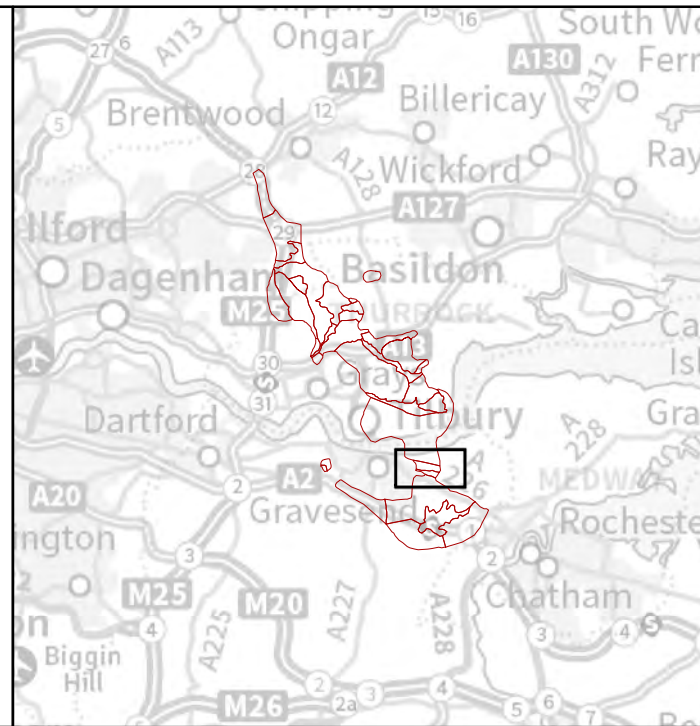
Plan of PQ Zone 6 showing all interventions where Head was recorded

Figure 9

Cross-Section 1



- PQ zone
 - Phase 2 GI intervention
 - Phase 3 GI intervention
 - NGGE GI intervention
 - Transect
- Superficial geology**
- Alluvium
 - Head
 - Lynch Hill Gravel Member
 - River Terrace Deposits
 - Taplow Gravel Member

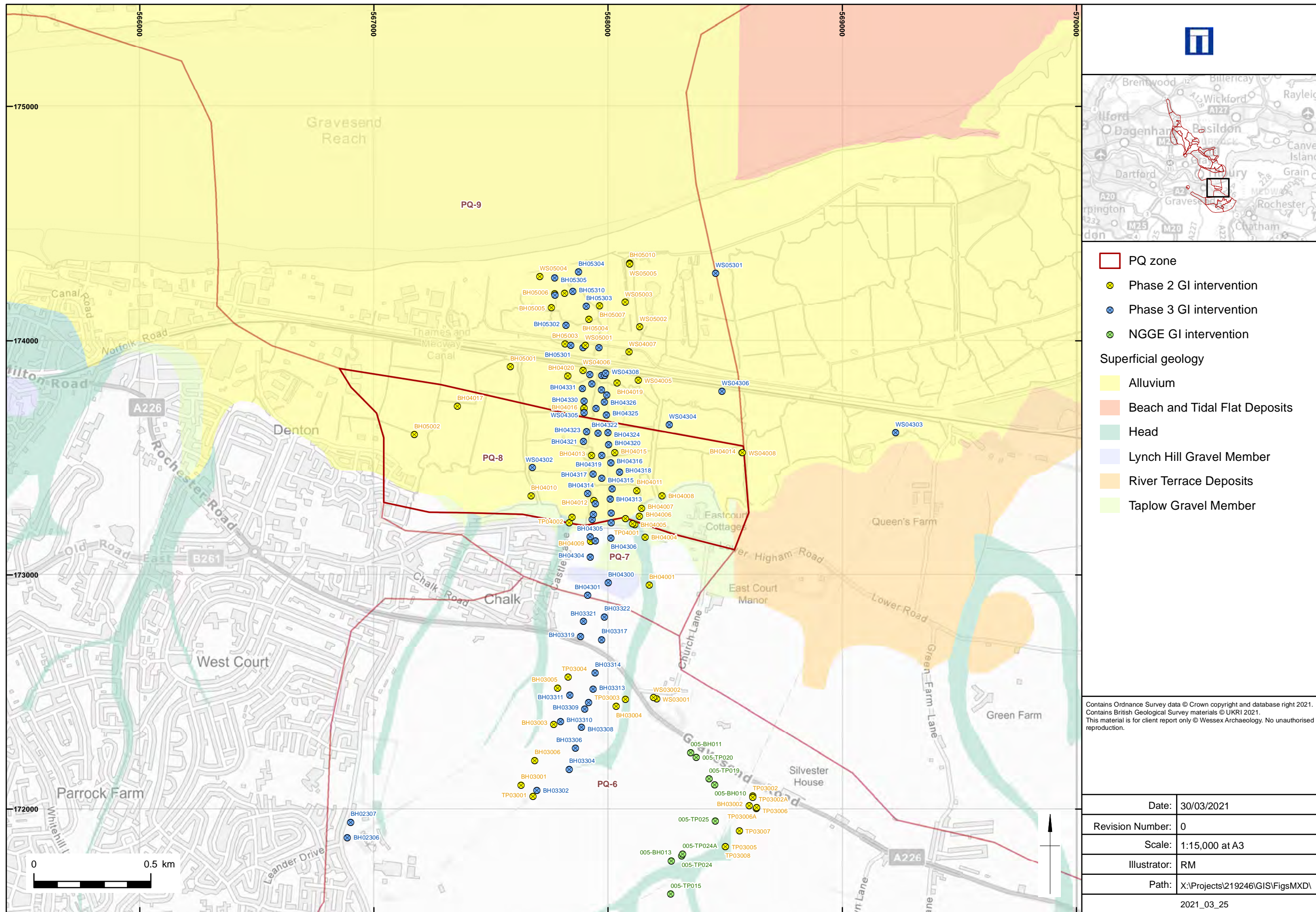


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Cross section 1

Figure 11



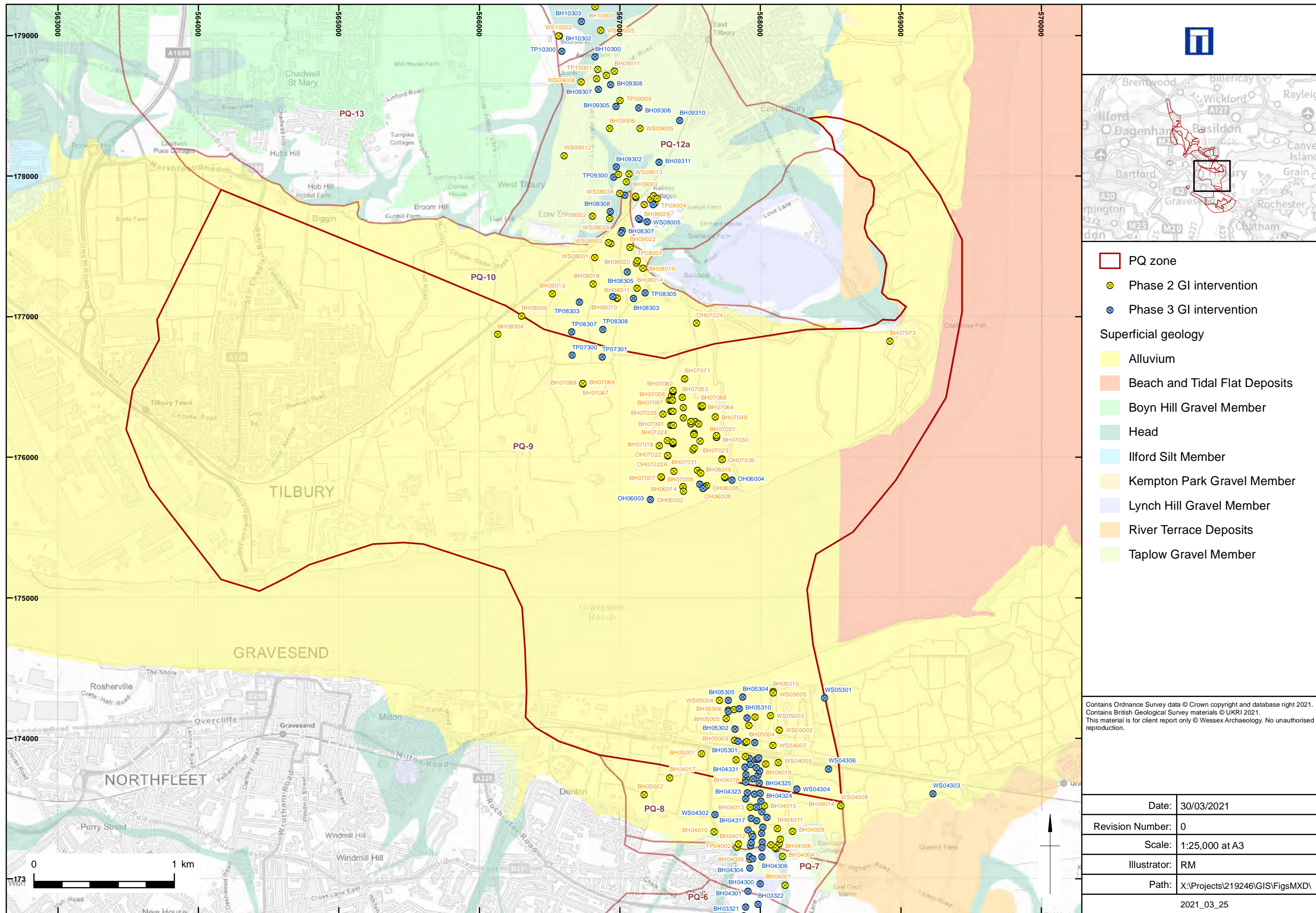
- PQ zone
 - Phase 2 GI intervention
 - Phase 3 GI intervention
 - NGGE GI intervention
- Superficial geology
- Alluvium
 - Beach and Tidal Flat Deposits
 - Head
 - Lynch Hill Gravel Member
 - River Terrace Deposits
 - Taplow Gravel Member

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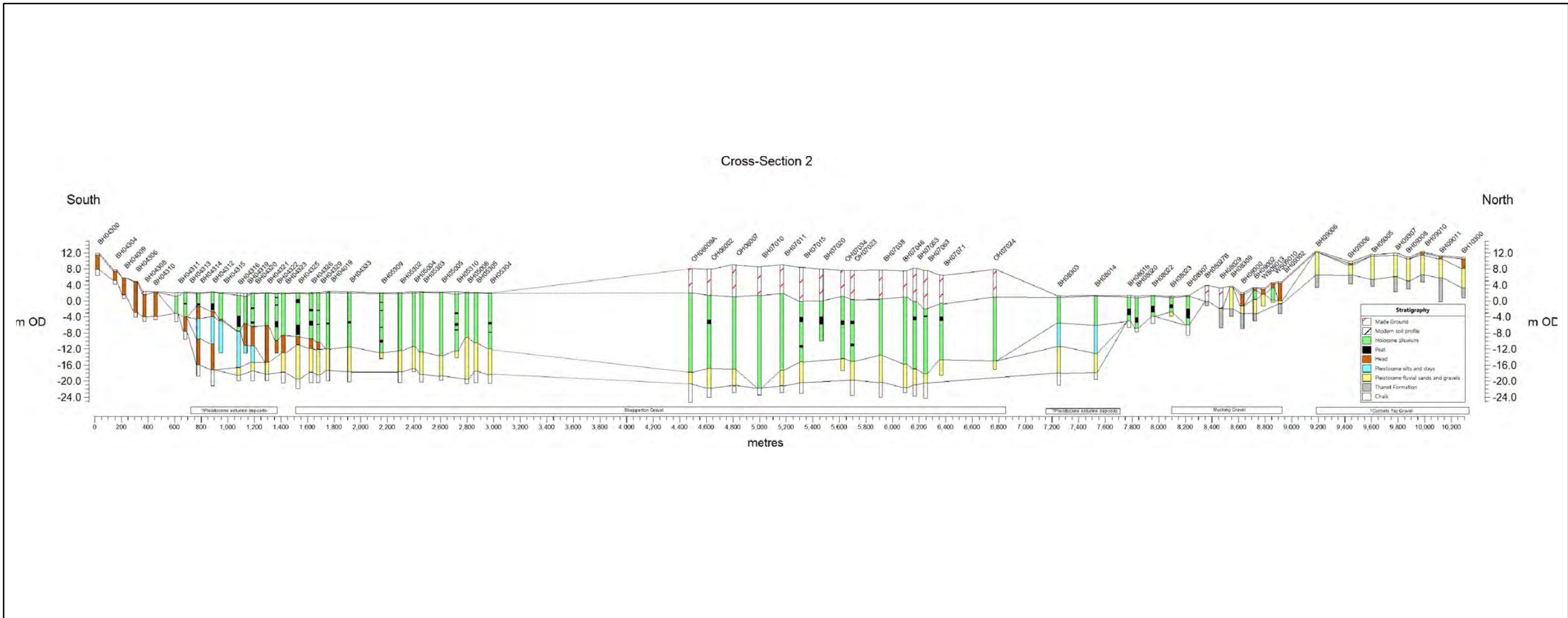
Plan of PQ Zone 8

Figure 12

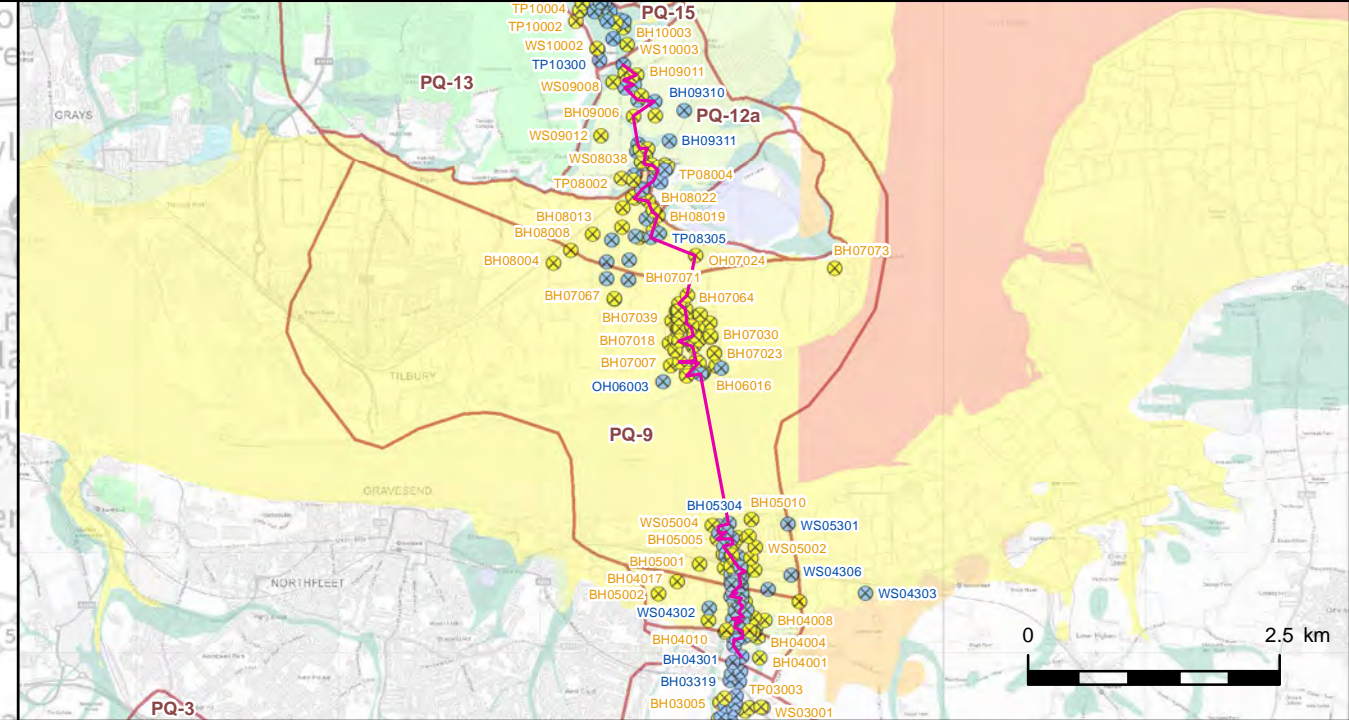
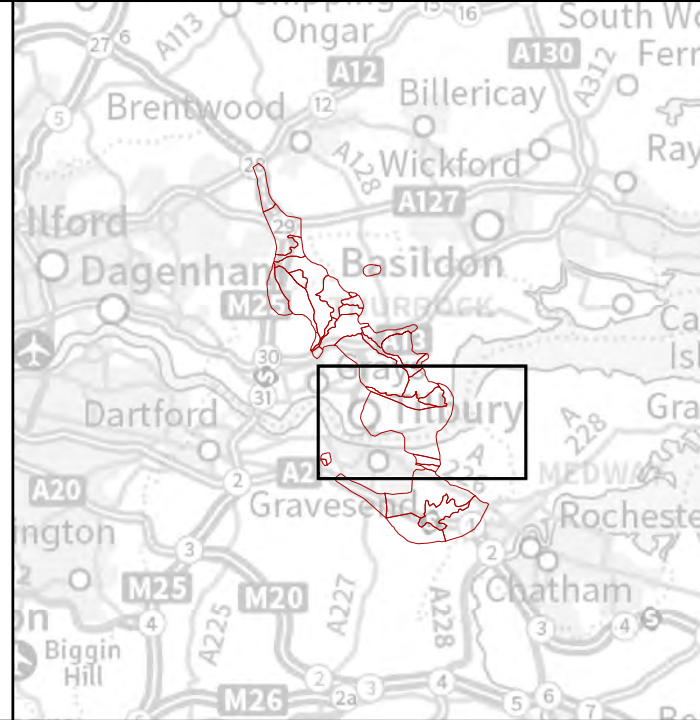


Plan of PQ Zone 9

Figure 13

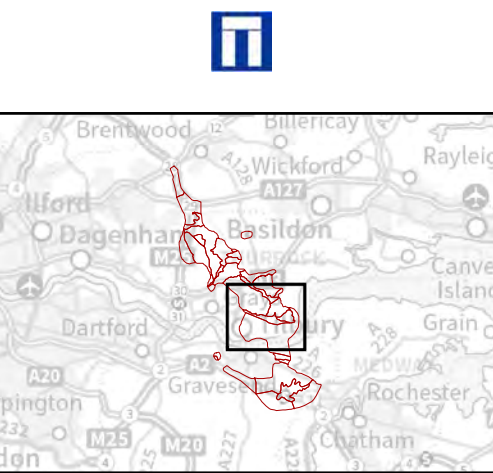
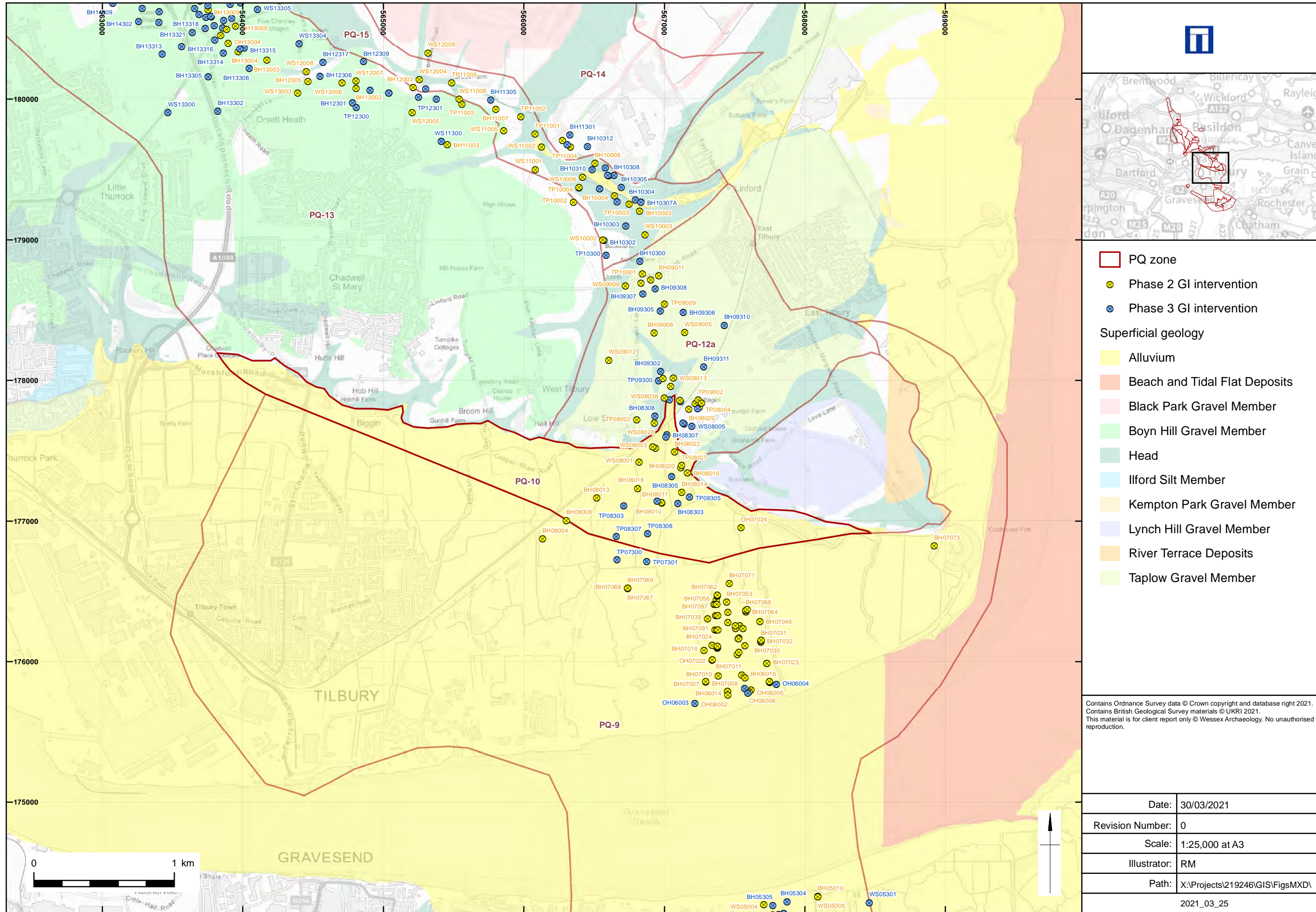


- PQ zone
- ⊗ Phase 2 GI intervention
- ⊙ Phase 3 GI intervention
- Transect
- Superficial geology**
- Alluvium
- Beach and Tidal Flat Deposits
- Boyn Hill Gravel Member
- Head
- Ilford Silt Member
- Kempton Park Gravel Member
- Lynch Hill Gravel Member
- River Terrace Deposits
- Taplow Gravel Member



Cross section 2

Figure 14



- PQ zone
 - Phase 2 GI intervention
 - Phase 3 GI intervention
- Superficial geology
- Alluvium
 - Beach and Tidal Flat Deposits
 - Black Park Gravel Member
 - Boyn Hill Gravel Member
 - Head
 - Ilford Silt Member
 - Kempton Park Gravel Member
 - Lynch Hill Gravel Member
 - River Terrace Deposits
 - Taplow Gravel Member

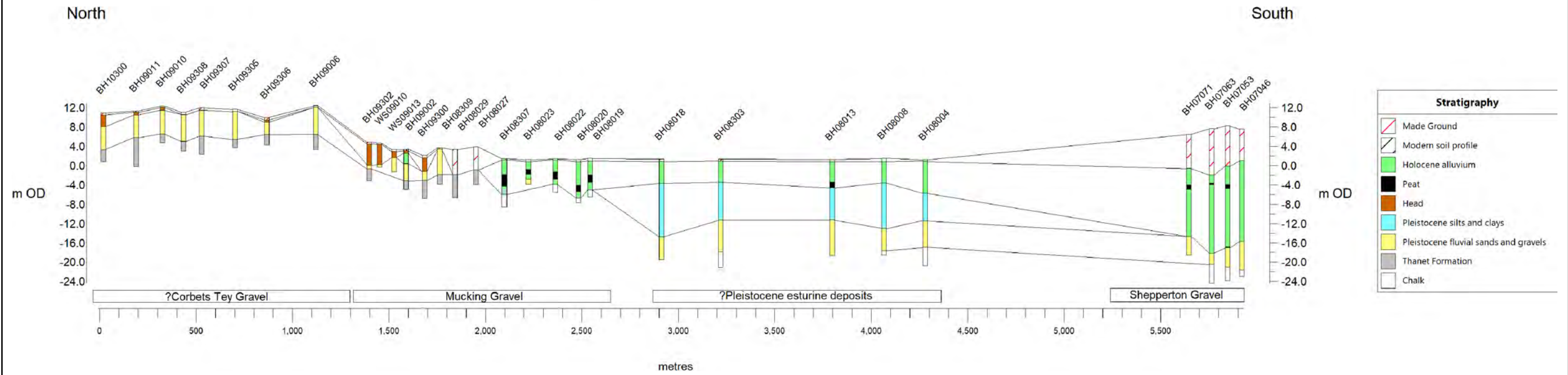
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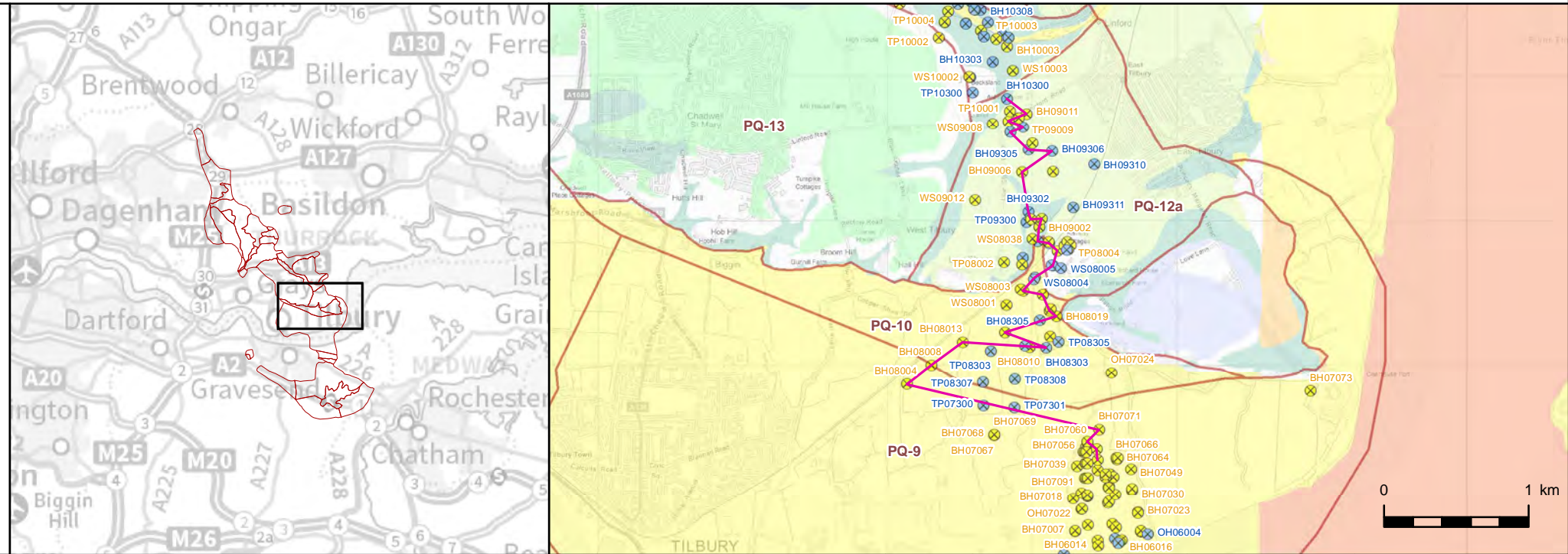
Plan of PQ Zone 10

Figure 15

Cross-Section 3

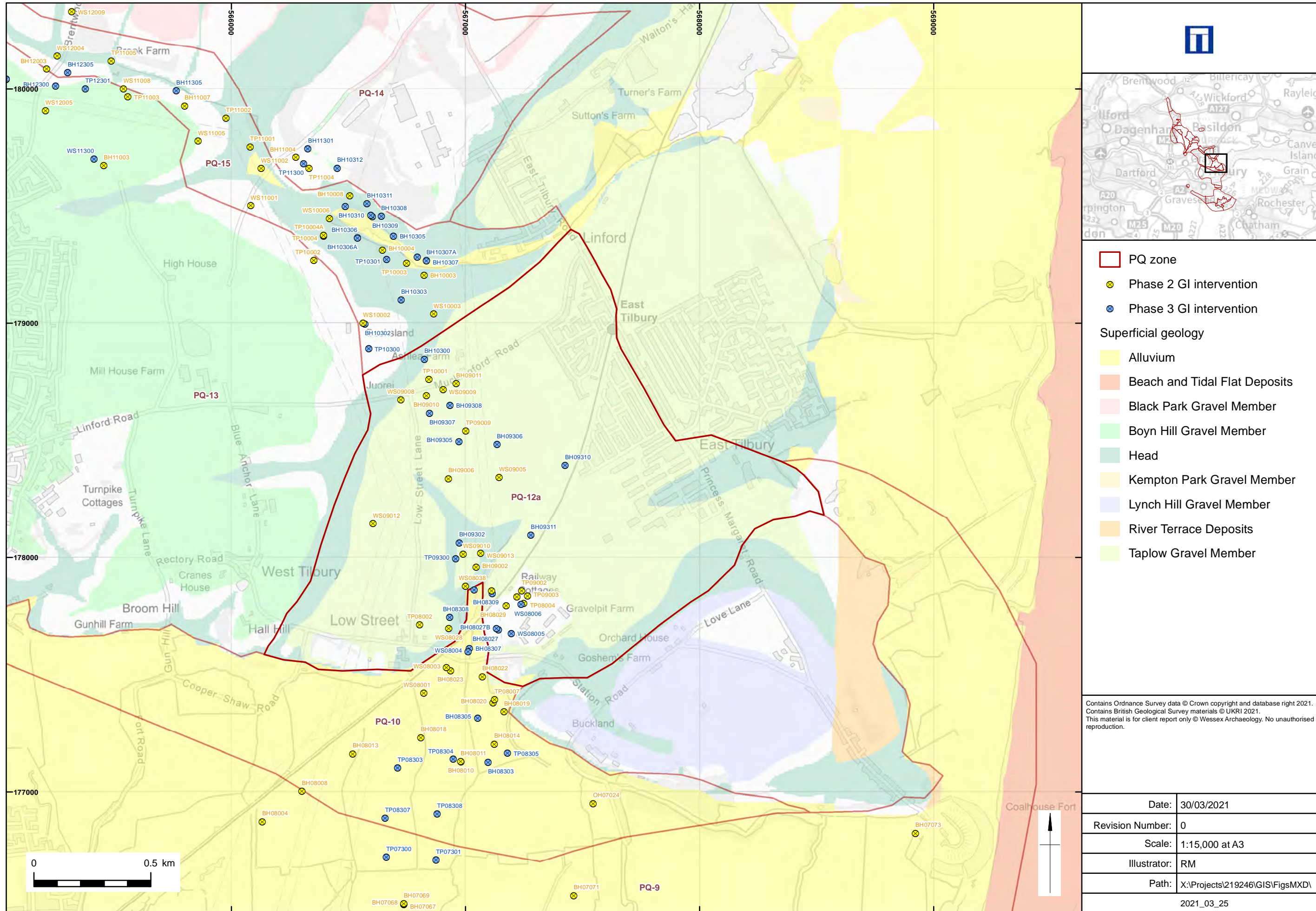


- PQ zone
- ⊗ Phase 2 GI intervention
- ⊗ Phase 3 GI intervention
- Transect
- Superficial geology
- Alluvium
- Beach and Tidal Flat Deposits
- Boyn Hill Gravel Member
- Head
- Kempton Park Gravel Member
- Lynch Hill Gravel Member
- River Terrace Deposits
- Taplow Gravel Member



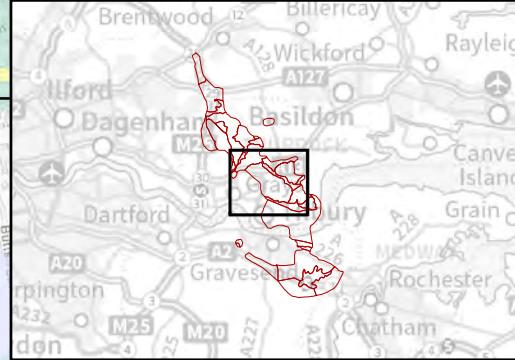
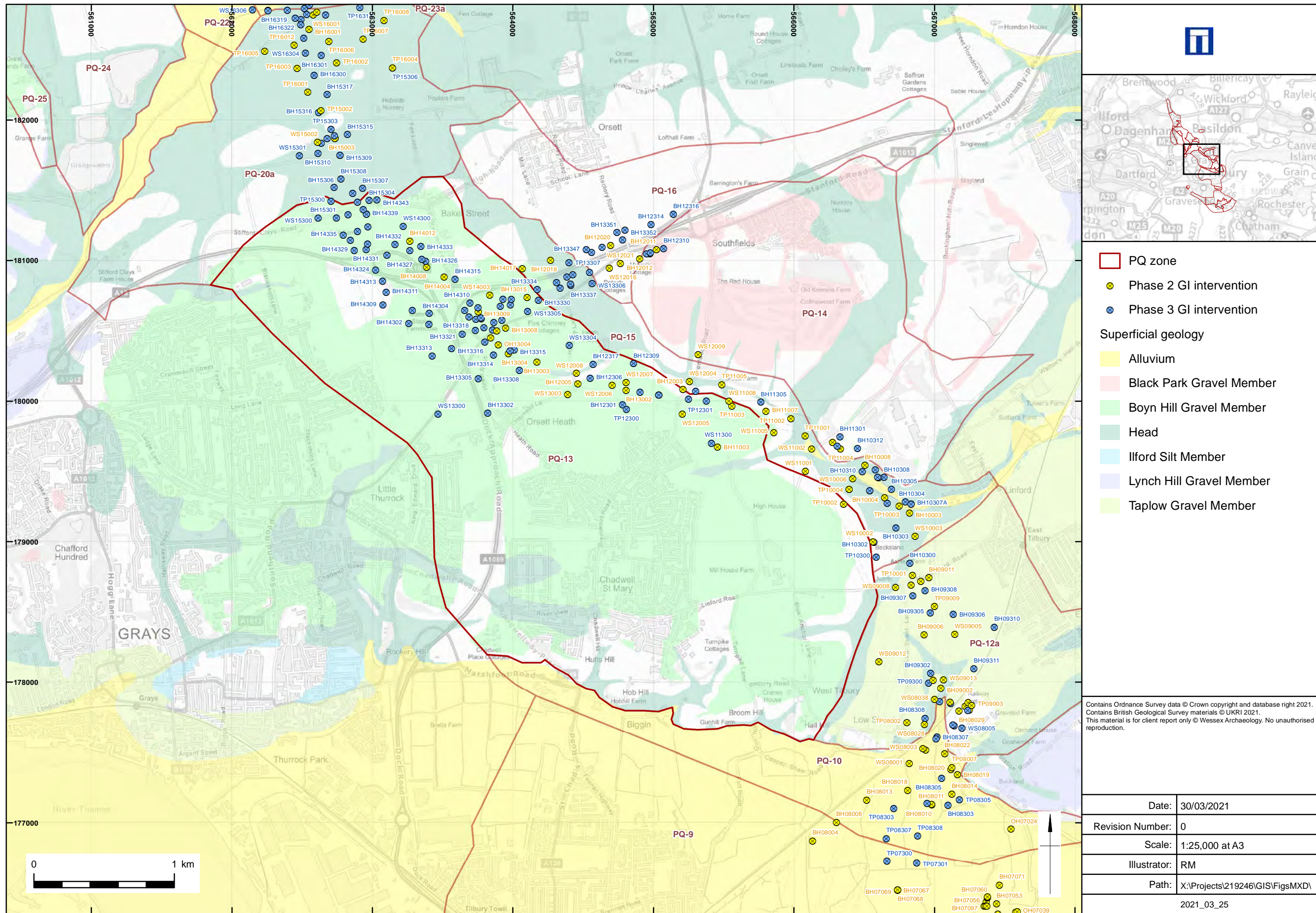
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Plan of PQ Zone 12a

Figure 17



- PQ zone
- Phase 2 GI intervention
- Phase 3 GI intervention
- Superficial geology
- Alluvium
- Black Park Gravel Member
- Boyn Hill Gravel Member
- Head
- Ilford Silt Member
- Lynch Hill Gravel Member
- Taplow Gravel Member

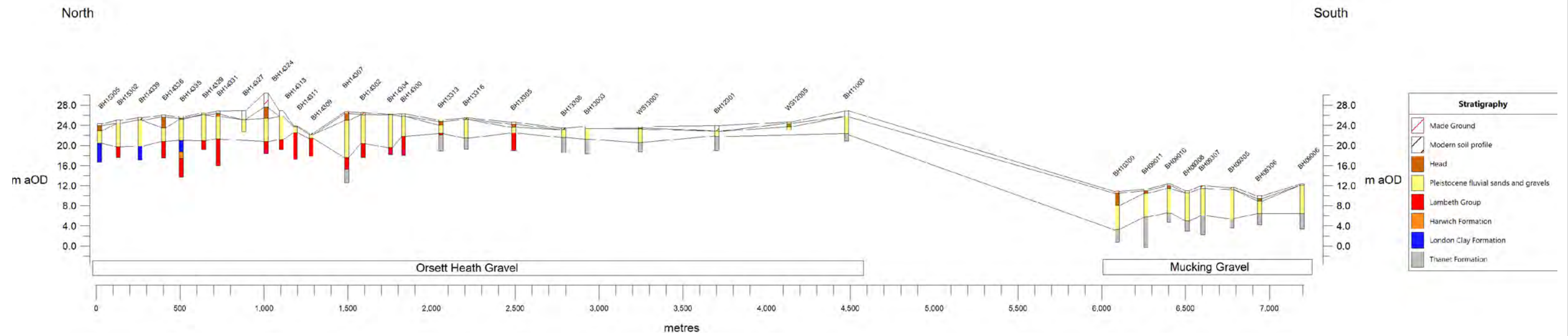
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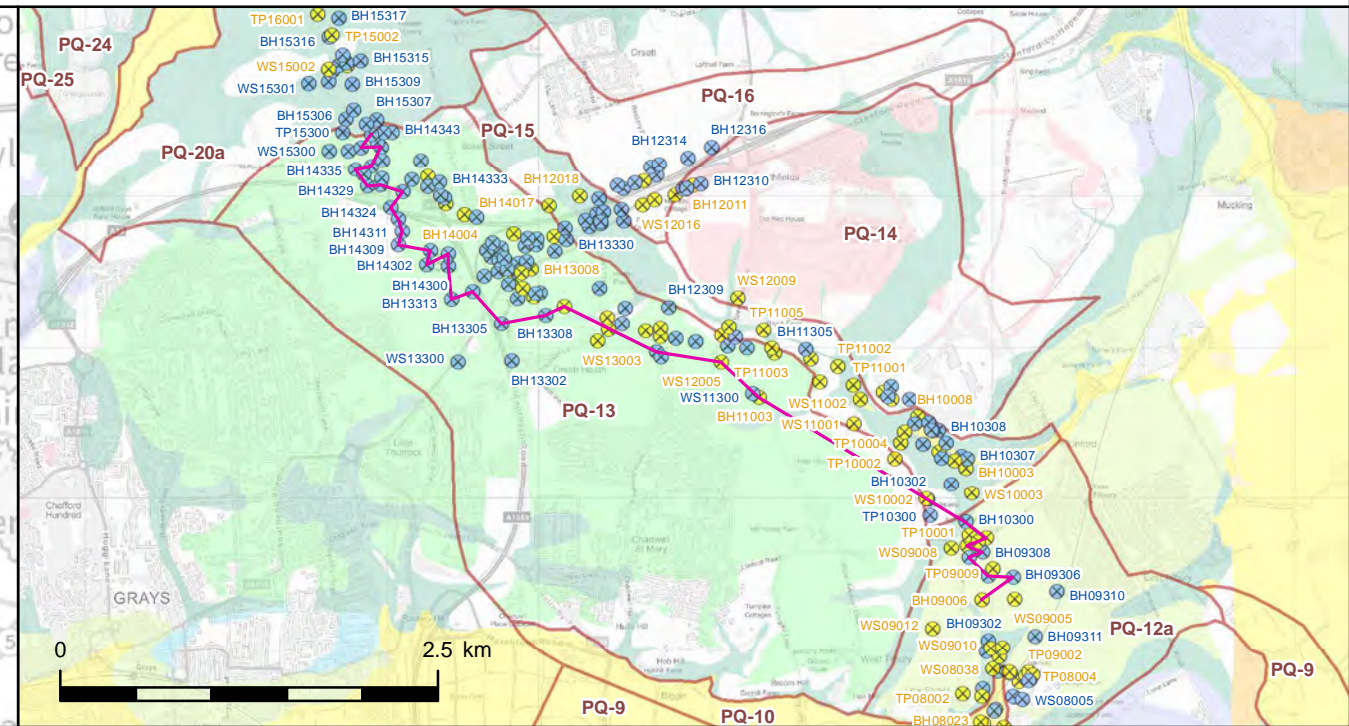
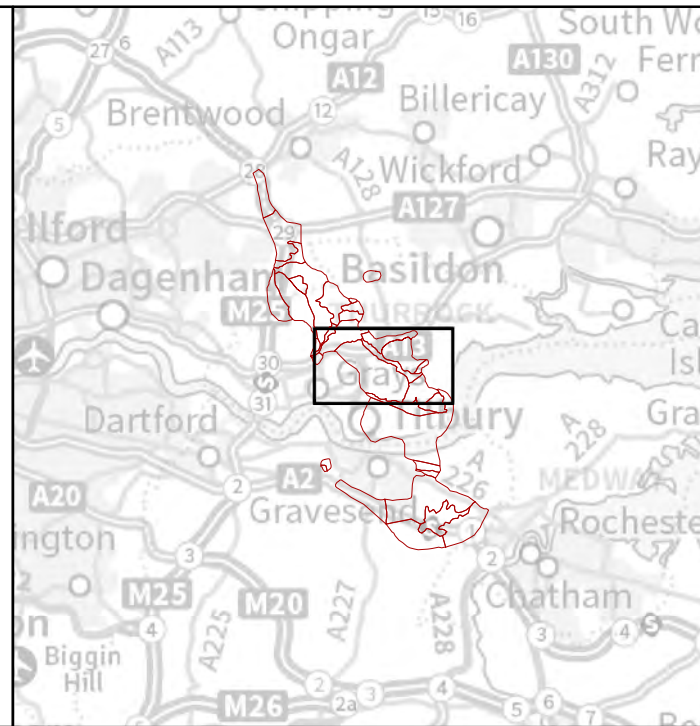
Plan of PQ Zone 13

Figure 18

Cross-Section 4

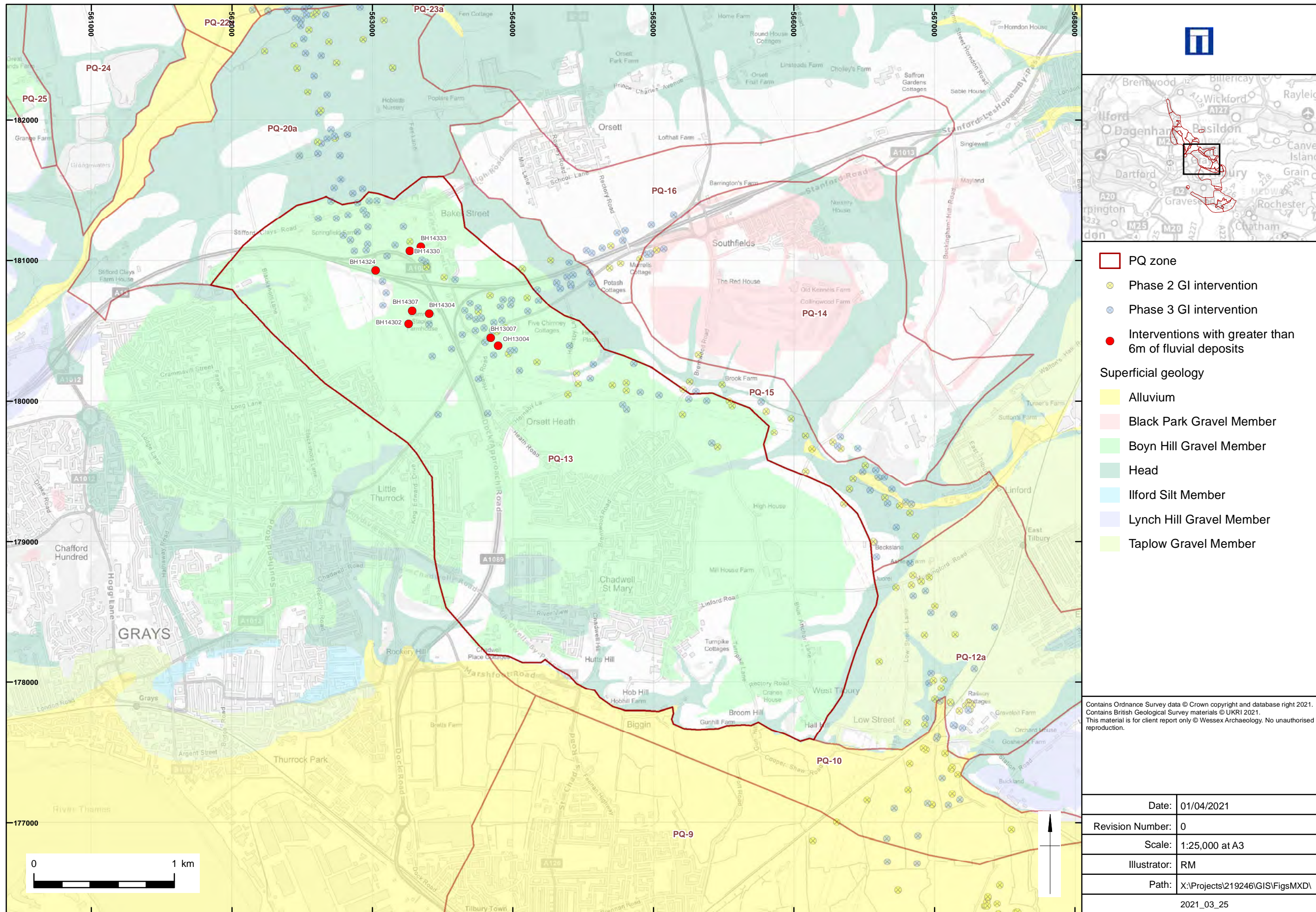


- PQ zone
- ⊗ Phase 2 GI intervention
- ⊙ Phase 3 GI intervention
- Transect
- Superficial geology
- Alluvium
- Beach and Tidal Flat Deposits
- Black Park Gravel Member
- Boyn Hill Gravel Member
- Hackney Gravel Member
- Head
- Ilford Silt Member
- Kempton Park Gravel Member
- Lynch Hill Gravel Member
- River Terrace Deposits
- Taplow Gravel Member



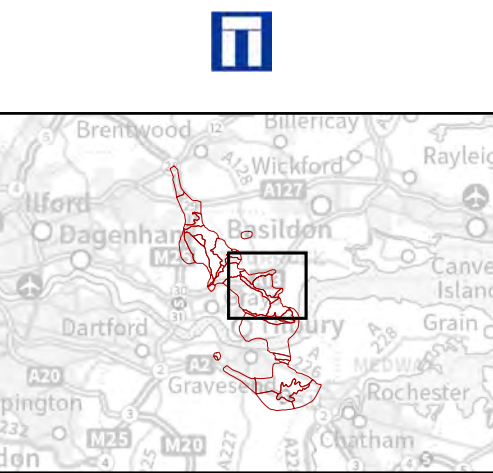
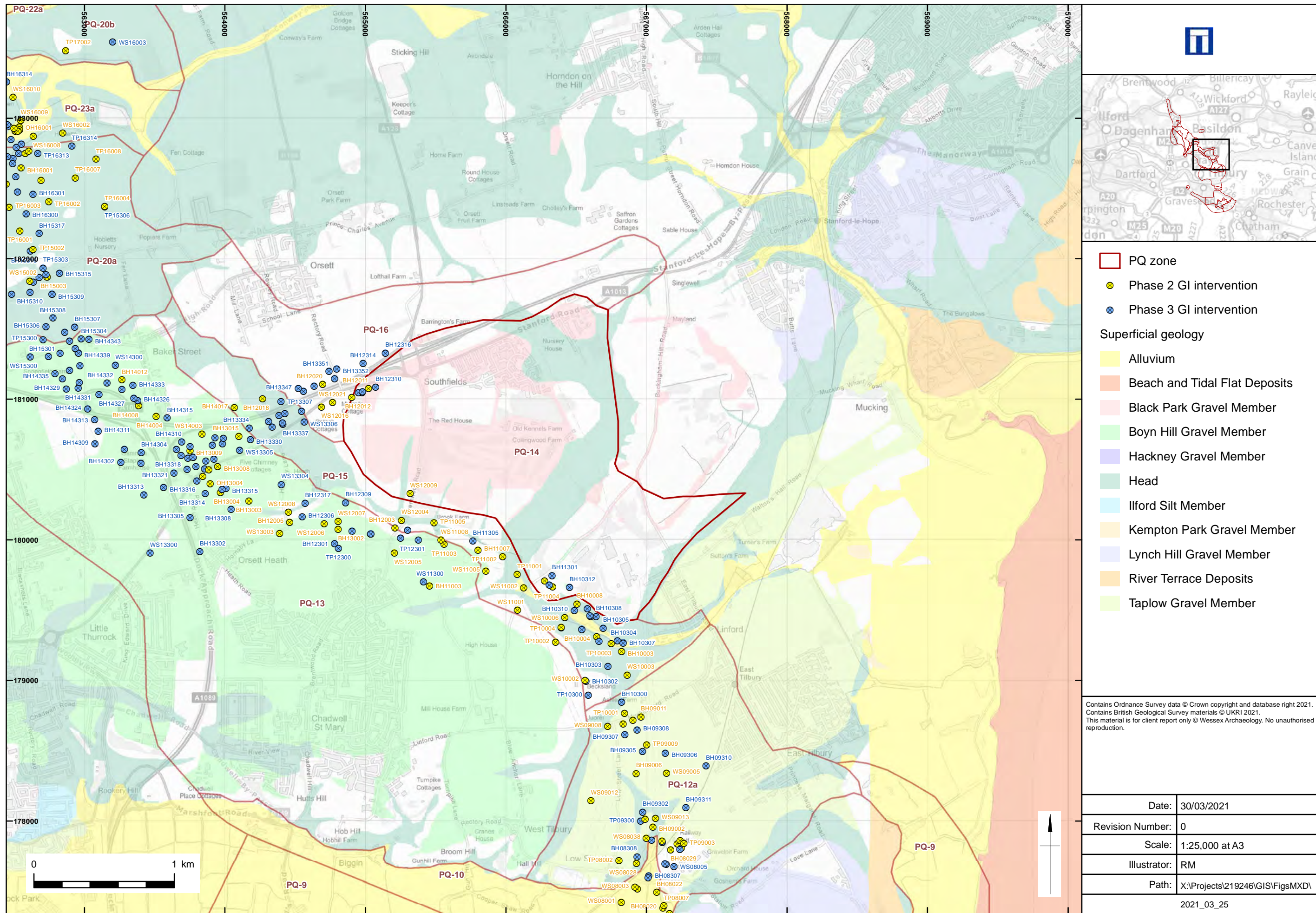
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Plan of PQ Zone 13 showing interventions with greater than 6m of fluvial deposits

Figure 20



- PQ zone
 - Phase 2 GI intervention
 - Phase 3 GI intervention
- Superficial geology
- Alluvium
 - Beach and Tidal Flat Deposits
 - Black Park Gravel Member
 - Boyn Hill Gravel Member
 - Hackney Gravel Member
 - Head
 - Ilford Silt Member
 - Kempton Park Gravel Member
 - Lynch Hill Gravel Member
 - River Terrace Deposits
 - Taplow Gravel Member

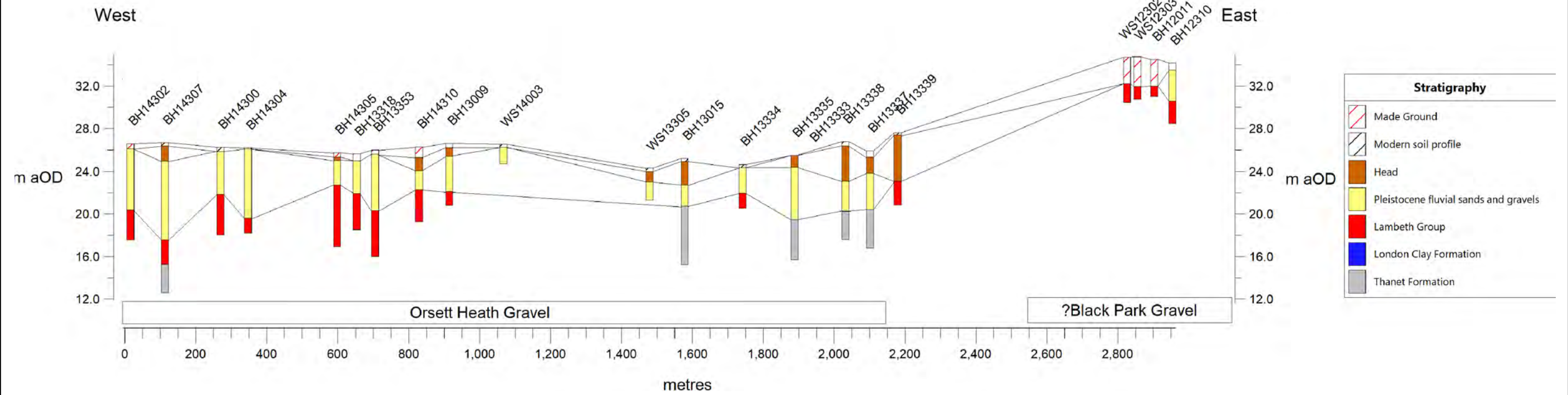
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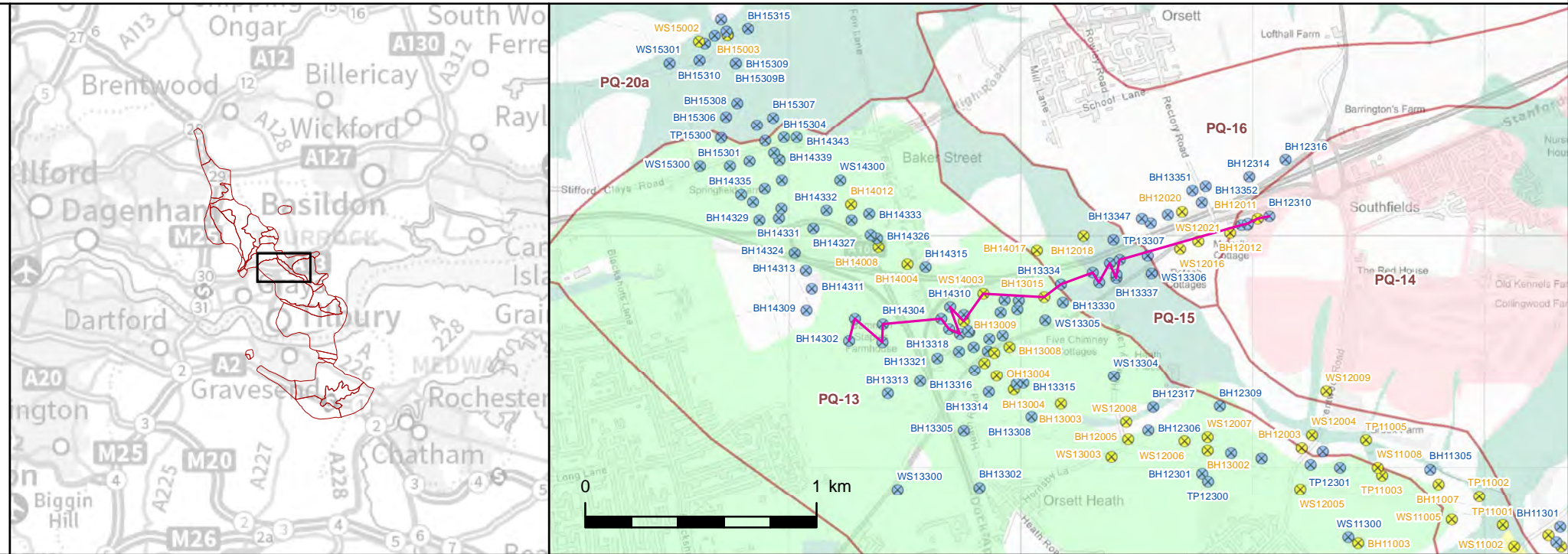
Plan of PQ Zone 14

Figure 21

Cross-Section 5

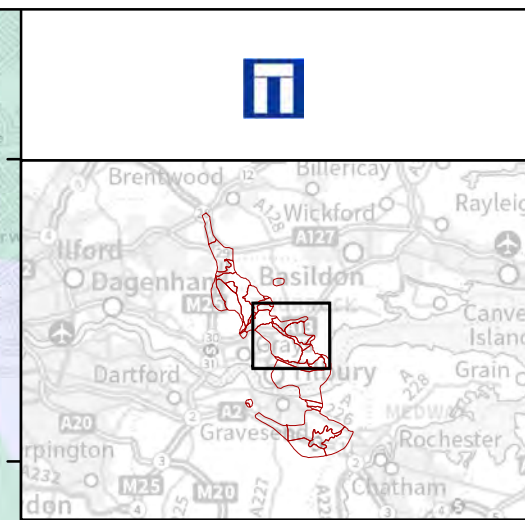
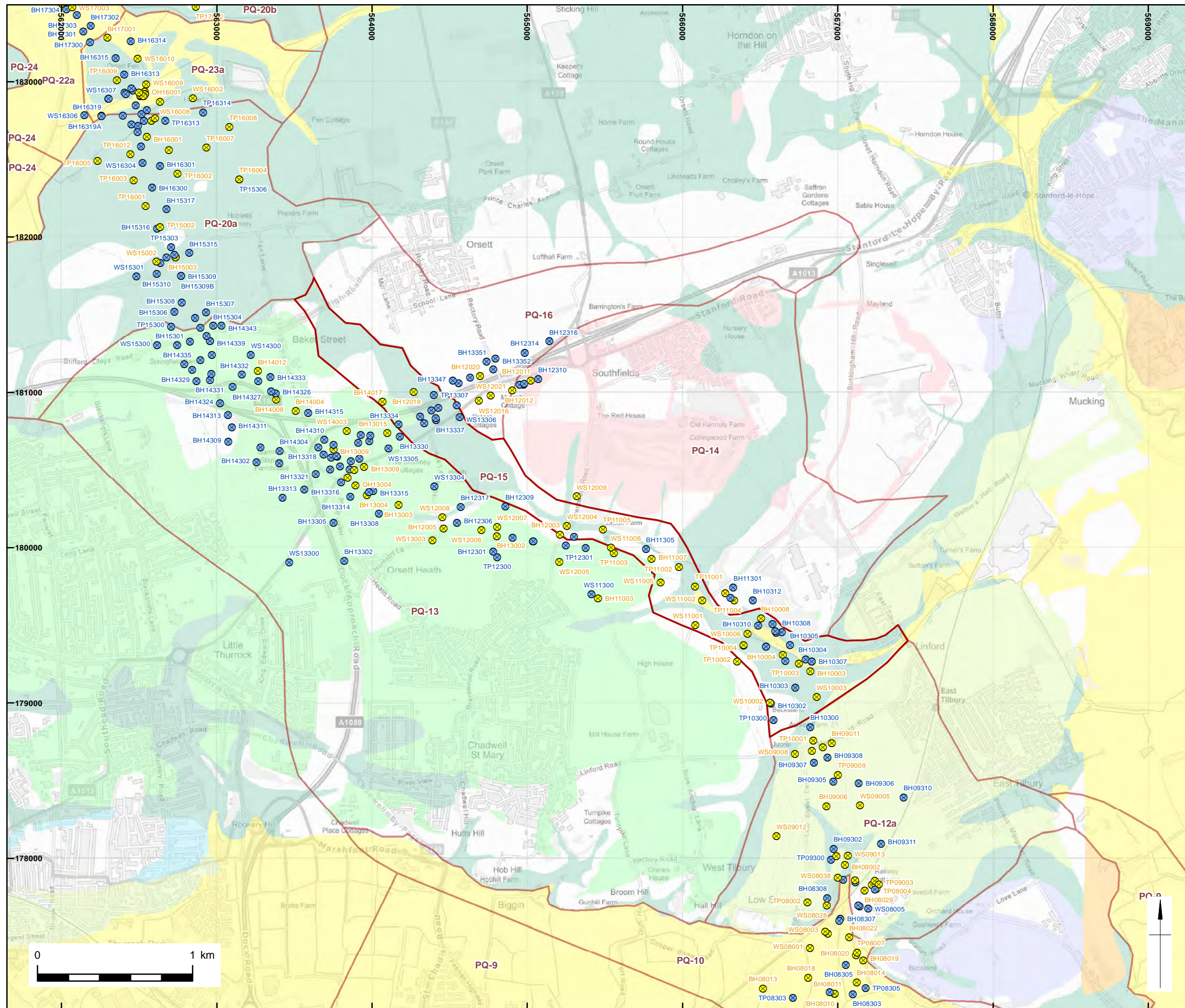


- PQ zone
- ⊗ Phase 2 GI intervention
- ⊗ Phase 3 GI intervention
- Transect
- Superficial geology
- Alluvium
- Black Park Gravel Member
- Boyn Hill Gravel Member
- Head



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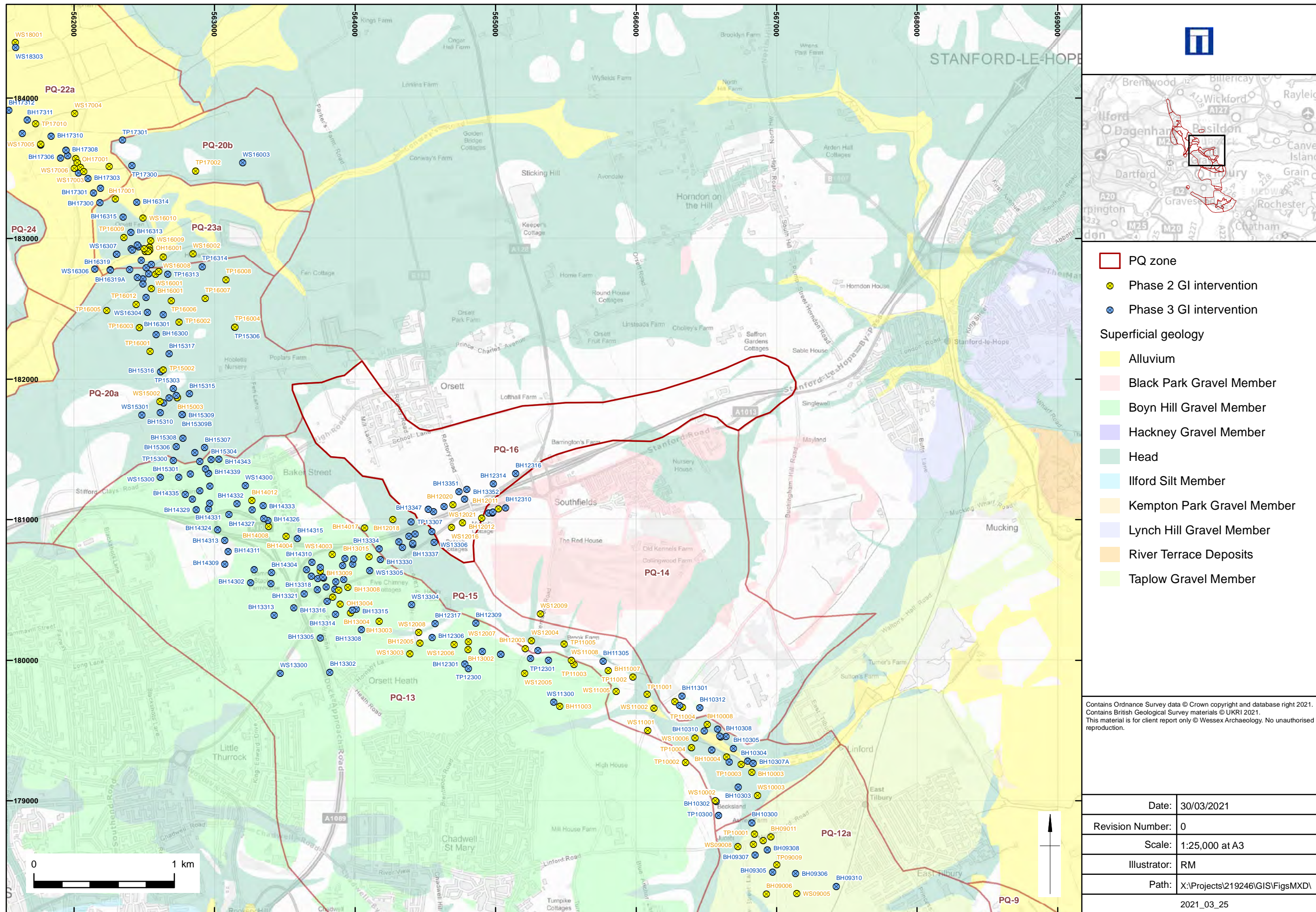
- PQ zone
 - Phase 2 GI intervention
 - Phase 3 GI intervention
- Superficial geology
- Alluvium
 - Beach and Tidal Flat Deposits
 - Black Park Gravel Member
 - Boyn Hill Gravel Member
 - Hackney Gravel Member
 - Head
 - Ilford Silt Member
 - Kempton Park Gravel Member
 - Lynch Hill Gravel Member
 - River Terrace Deposits
 - Taplow Gravel Member

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Plan of PQ Zone 15

Figure 23



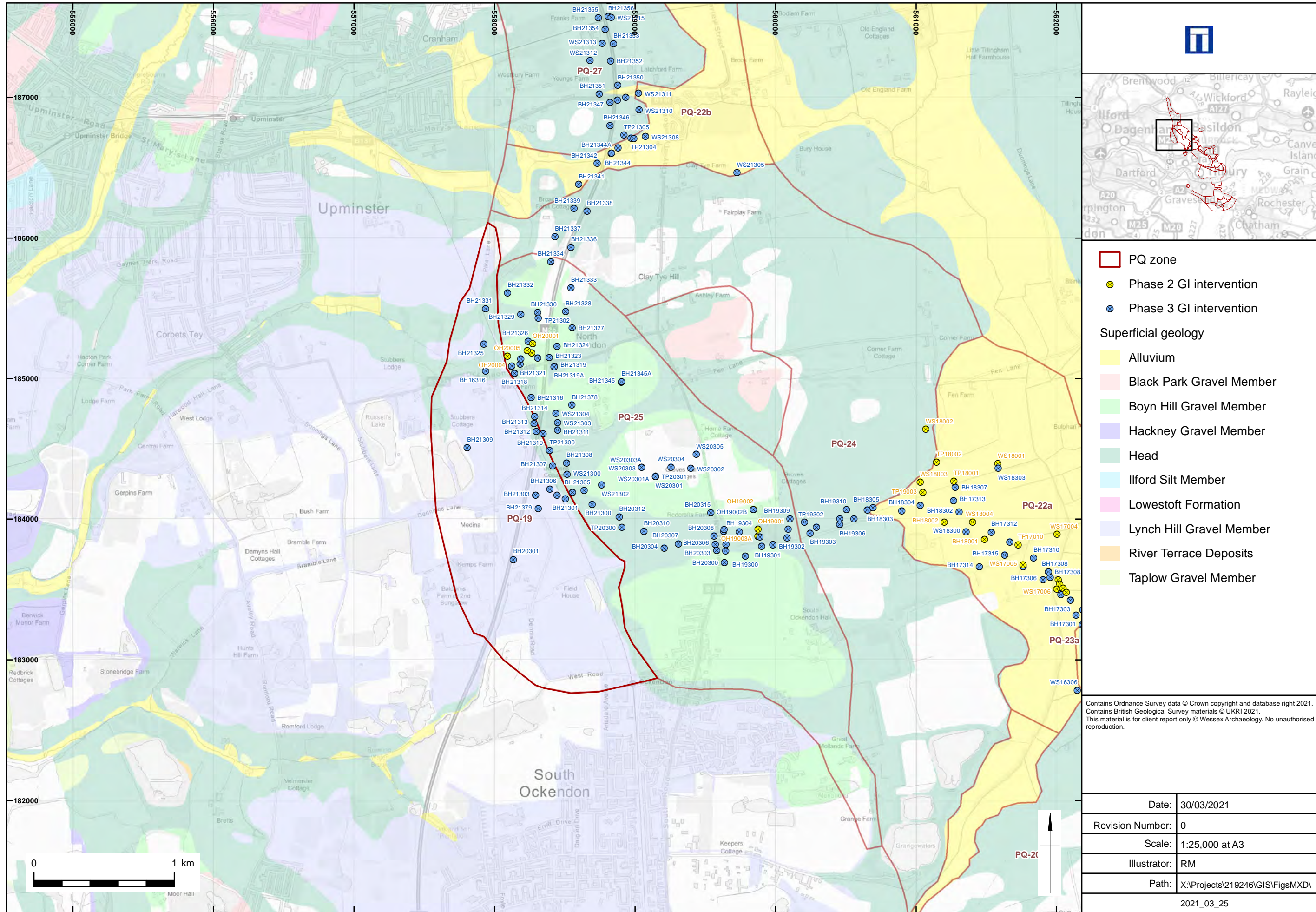
- PQ zone
 - Phase 2 GI intervention
 - Phase 3 GI intervention
- Superficial geology
- Alluvium
 - Black Park Gravel Member
 - Boyn Hill Gravel Member
 - Hackney Gravel Member
 - Head
 - Ilford Silt Member
 - Kempton Park Gravel Member
 - Lynch Hill Gravel Member
 - River Terrace Deposits
 - Taplow Gravel Member

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Plan of PQ Zone 16

Figure 24



- PQ zone
 - Phase 2 GI intervention
 - Phase 3 GI intervention
- Superficial geology
- Alluvium
 - Black Park Gravel Member
 - Boyn Hill Gravel Member
 - Hackney Gravel Member
 - Head
 - Ilford Silt Member
 - Lowestoft Formation
 - Lynch Hill Gravel Member
 - River Terrace Deposits
 - Taplow Gravel Member

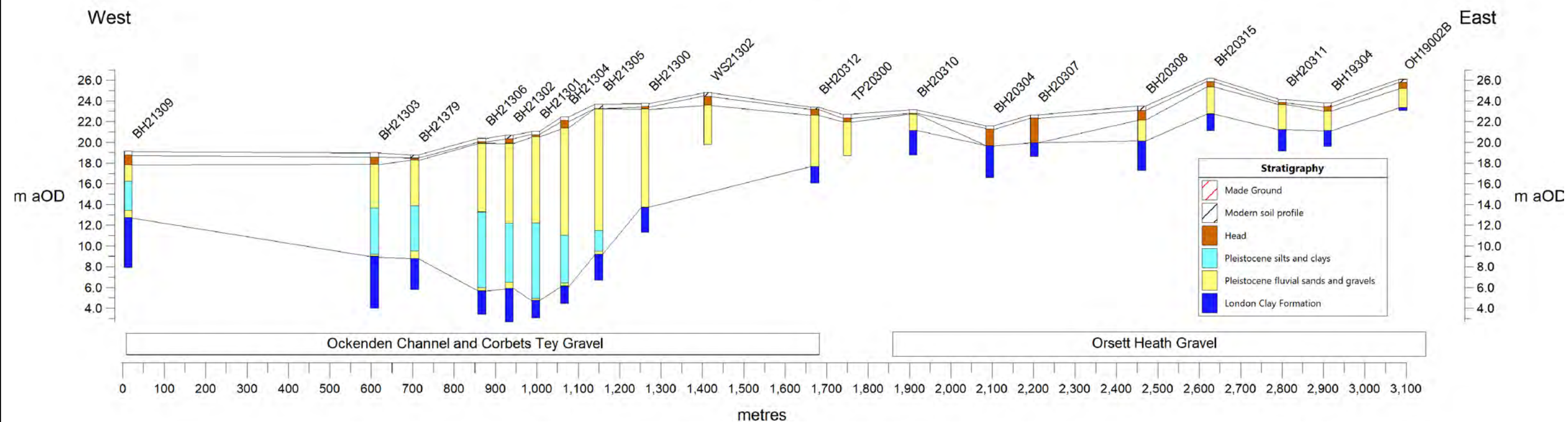
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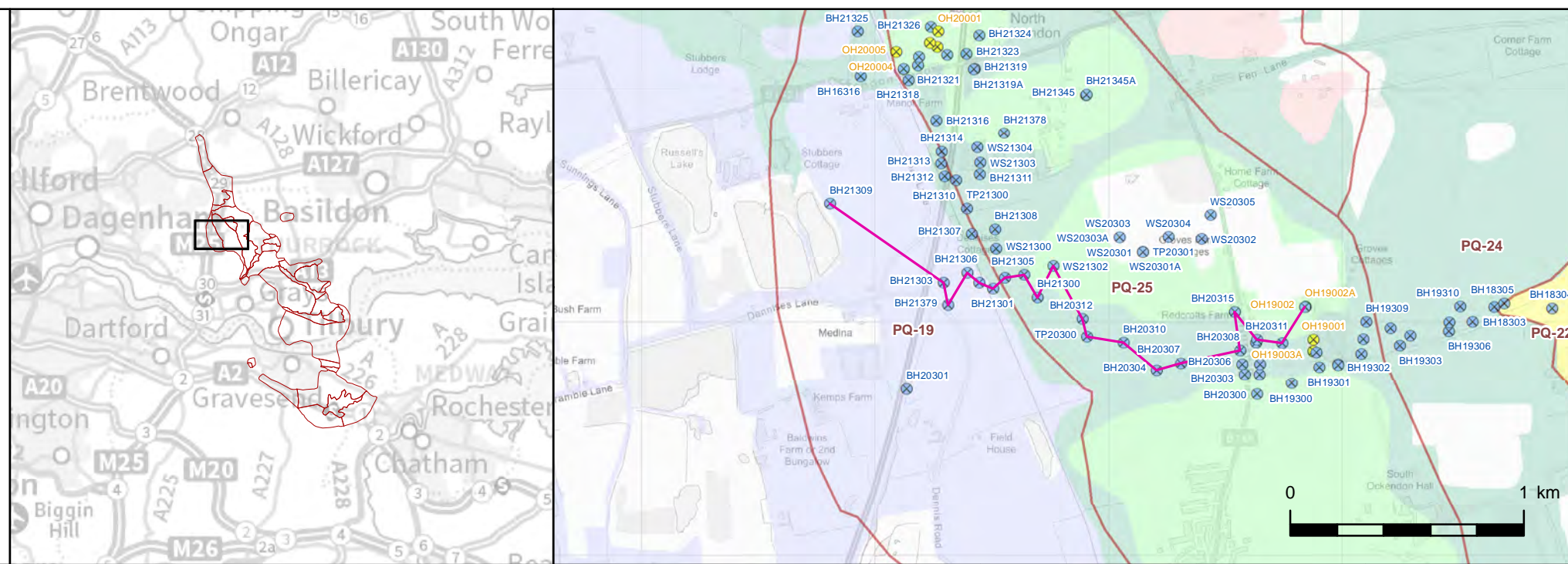
Plan of PQ Zone 19

Figure 25

Cross-Section 6



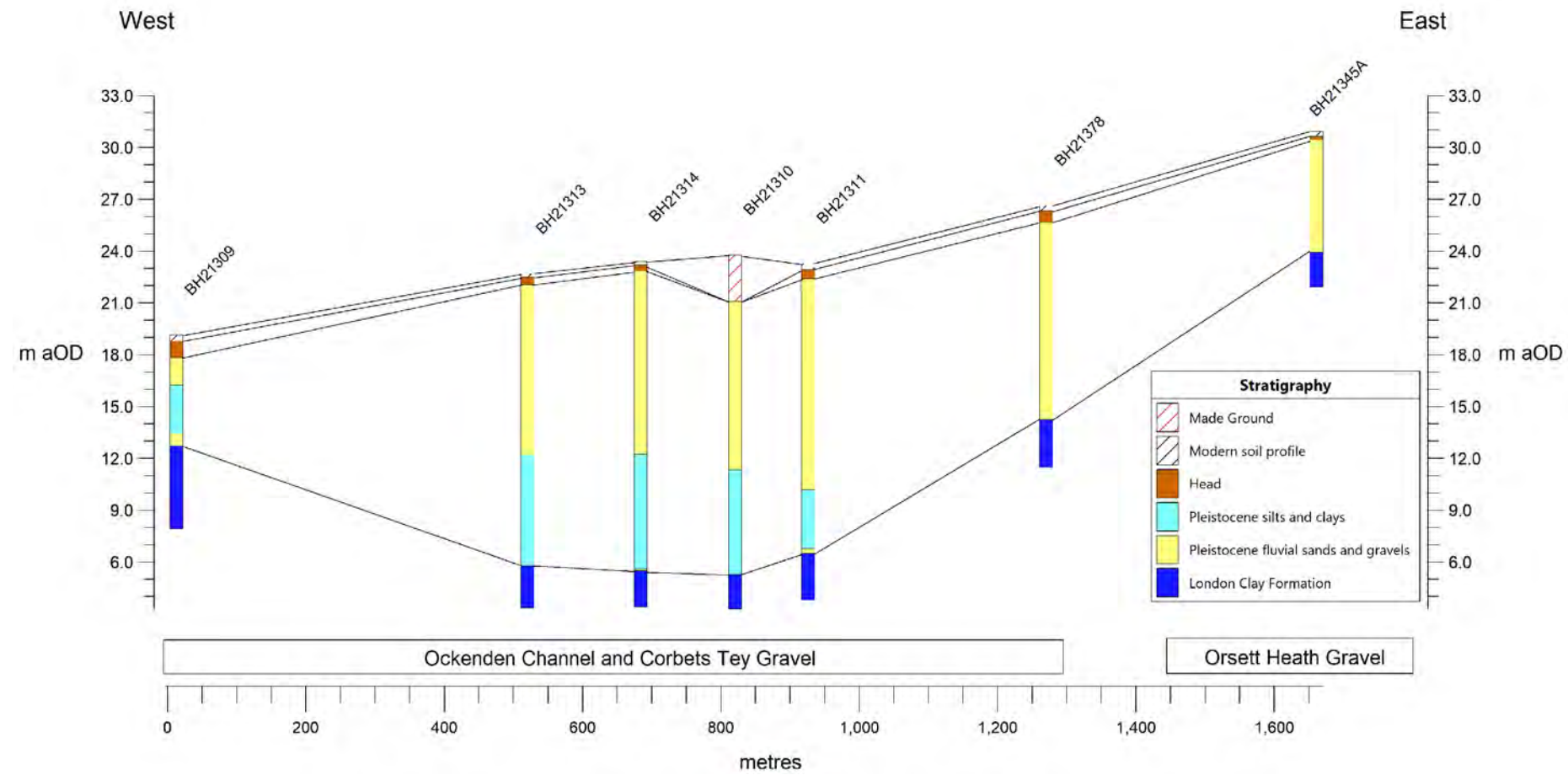
- PQ zone
- Phase 2 GI intervention
- ⊗ Phase 3 GI intervention
- Transect
- Superficial geology
 - Alluvium
 - Black Park Gravel Member
 - Boyn Hill Gravel Member
 - Head
 - Lynch Hill Gravel Member



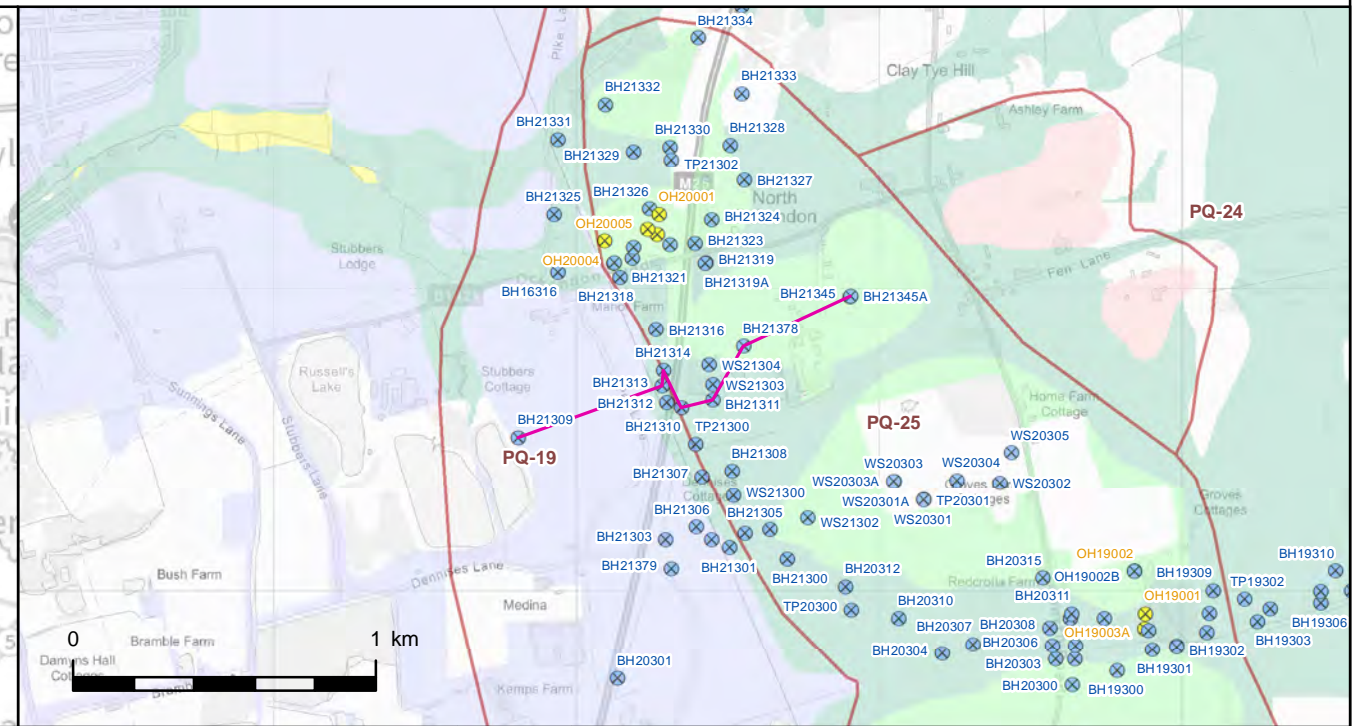
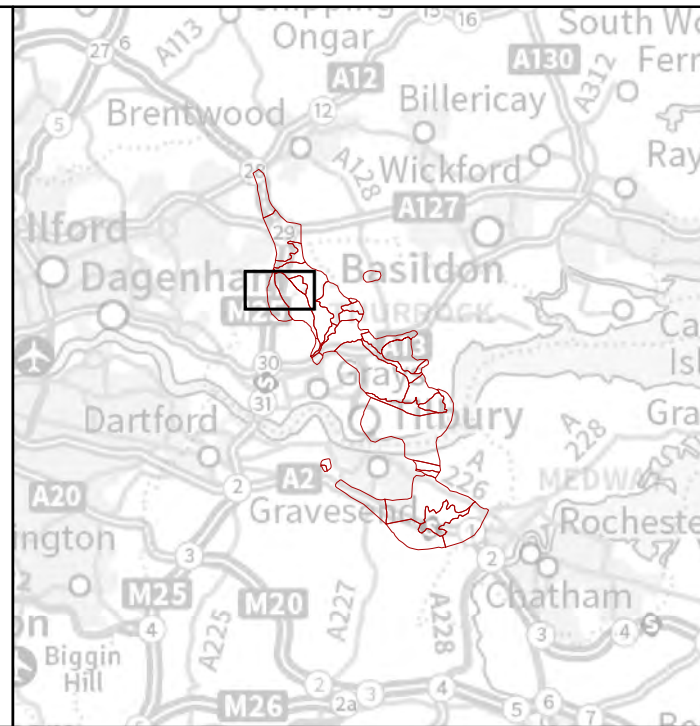
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Cross-Section 7

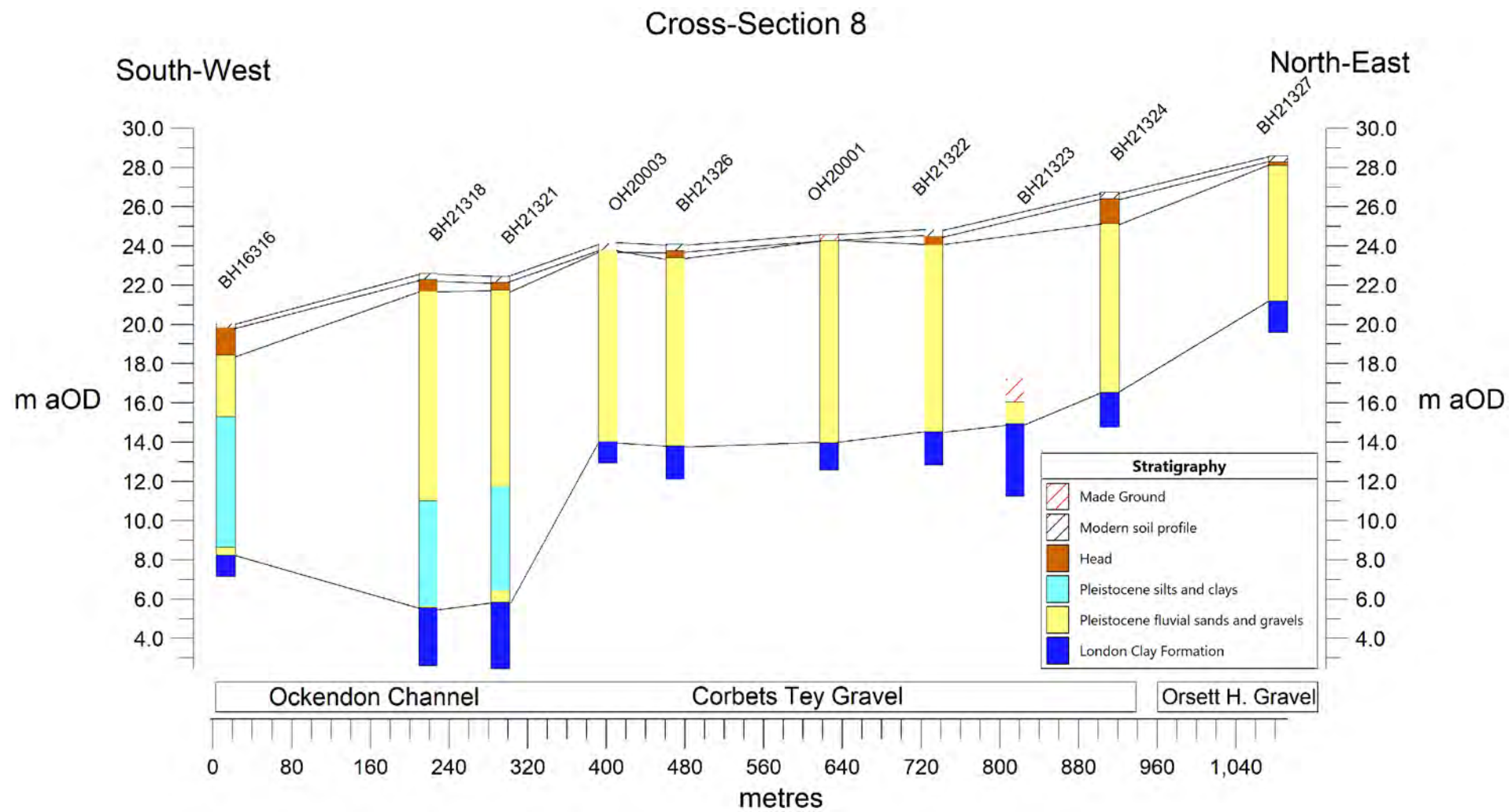


- PQ zone
- Phase 2 GI intervention
- Phase 3 GI intervention
- Transect
- Superficial geology
 - Alluvium
 - Black Park Gravel Member
 - Boyn Hill Gravel Member
 - Head
 - Lynch Hill Gravel Member

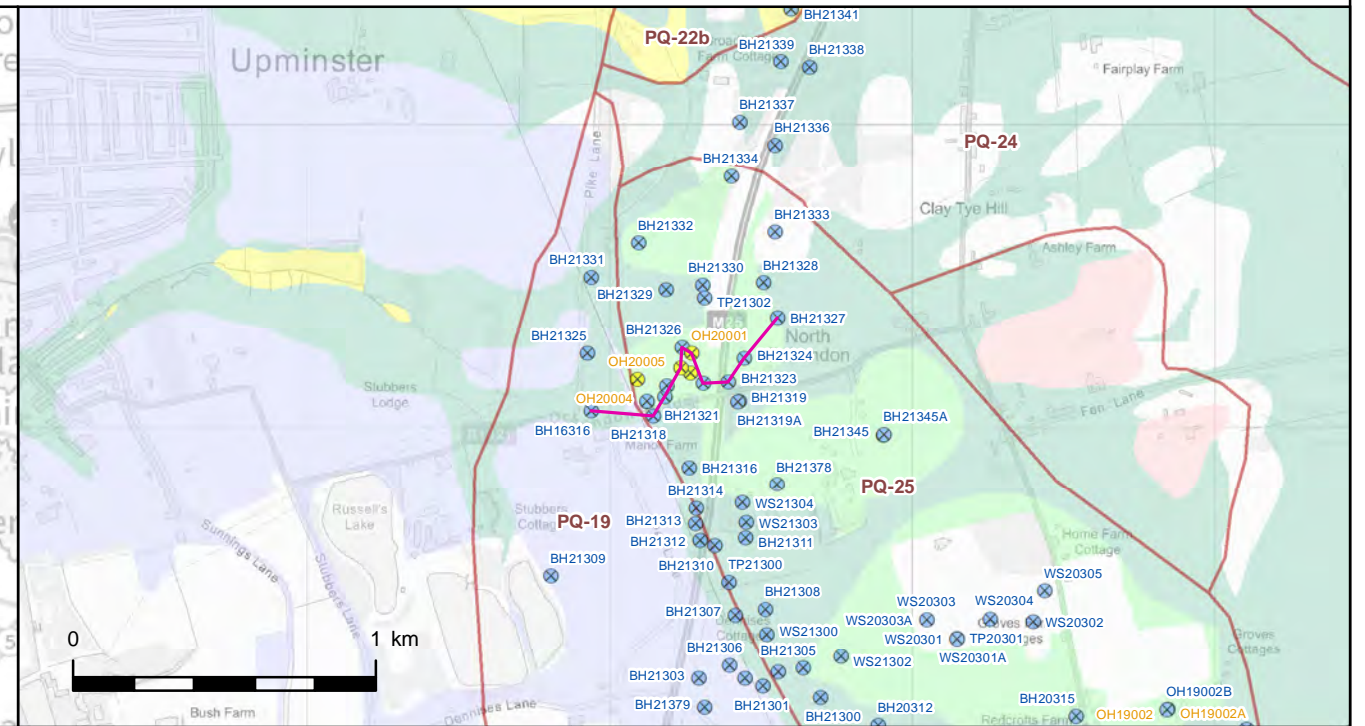
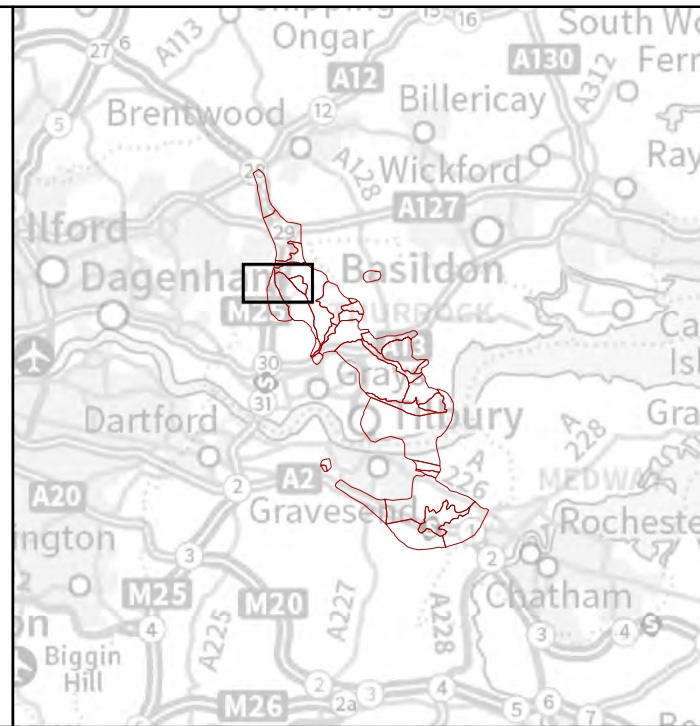


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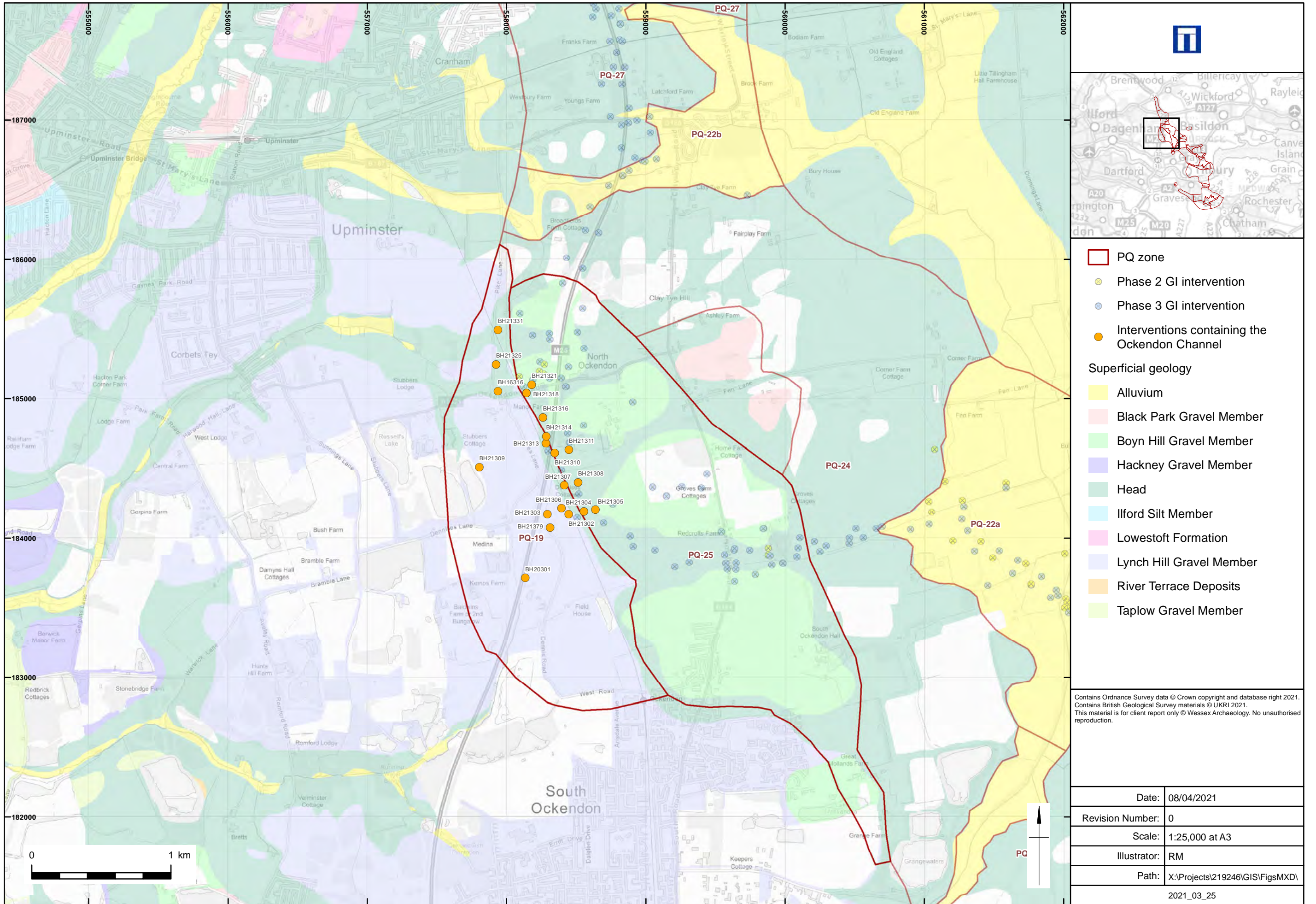
- PQ zone
- Phase 2 GI intervention
- ⊗ Phase 3 GI intervention
- Transect
- Superficial geology**
- Alluvium
- Black Park Gravel Member
- Boyn Hill Gravel Member
- Head
- Lynch Hill Gravel Member



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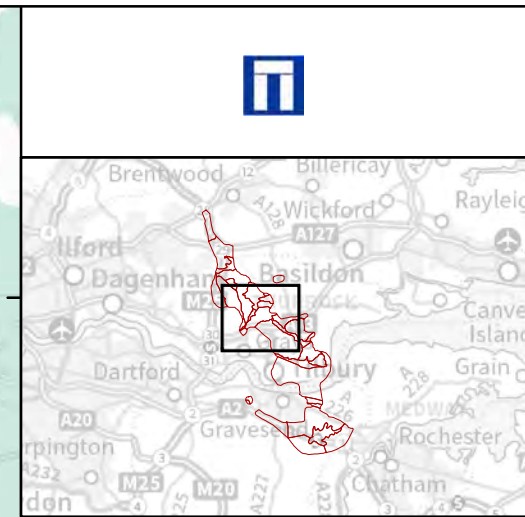
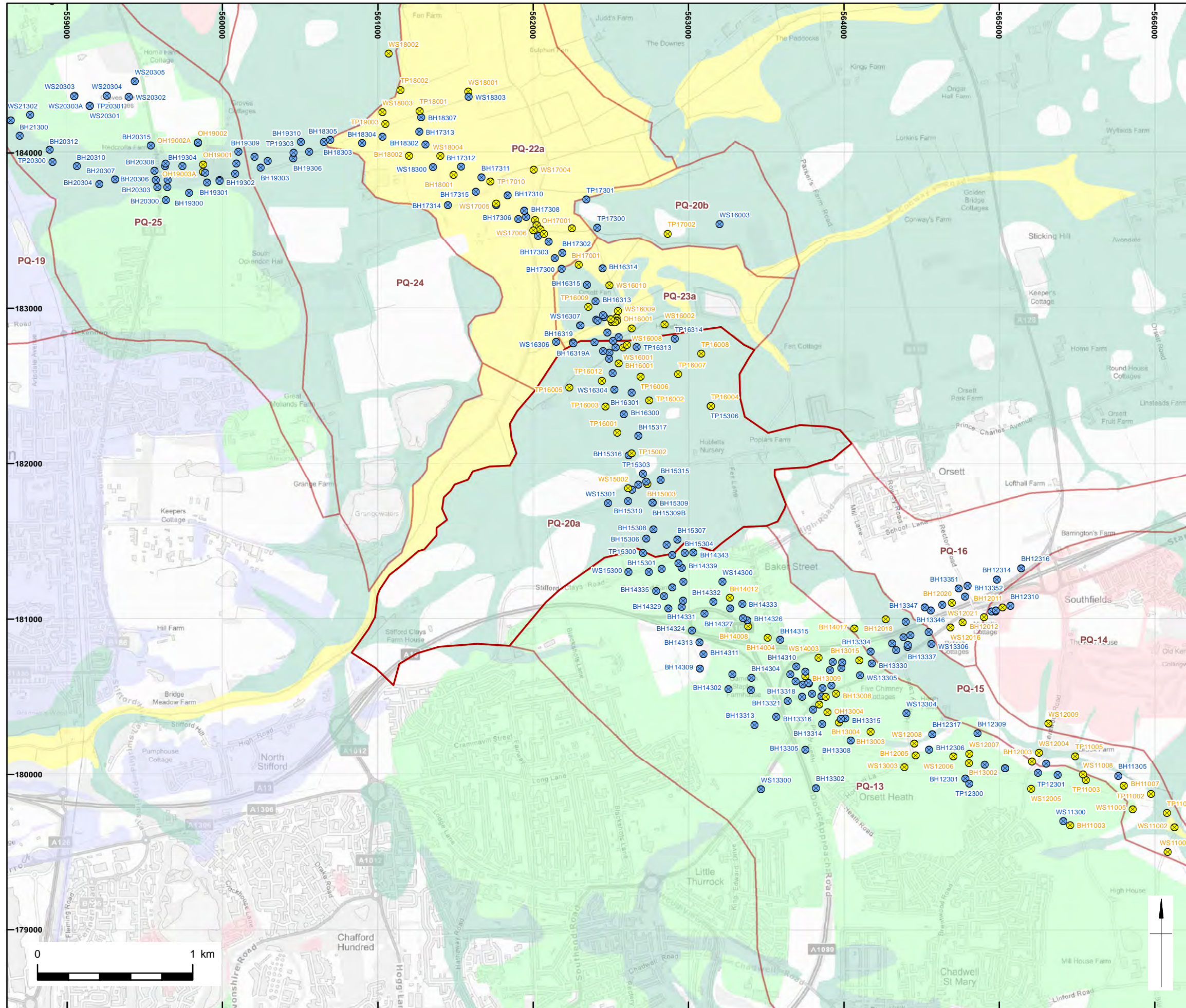
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Plan of PQ Zones 19 and 25 showing interventions containing containing the Ockendon Channel

Figure 29



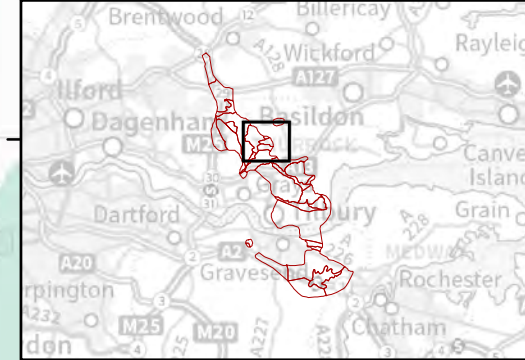
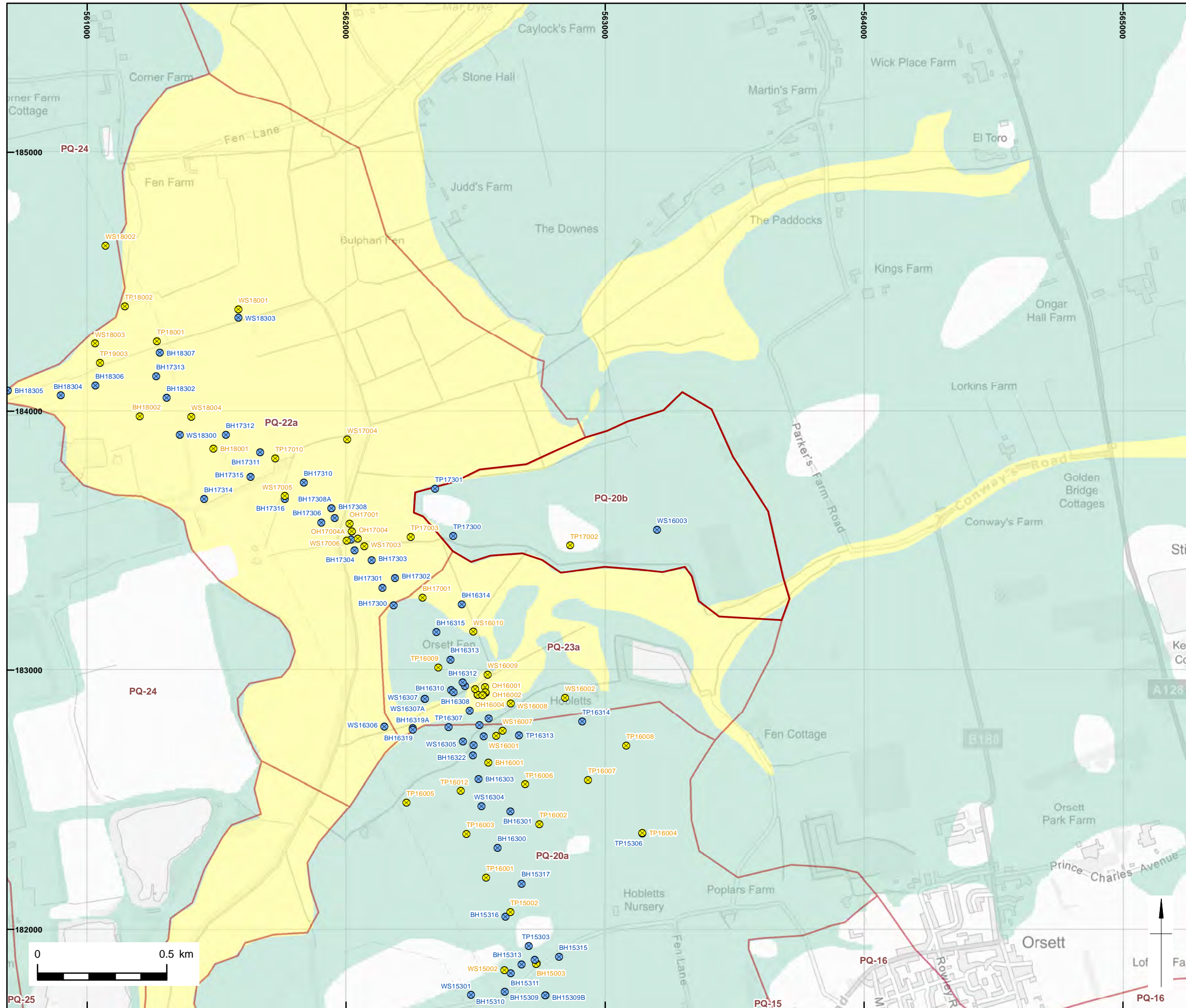
- PQ zone
 - Phase 2 GI intervention
 - Phase 3 GI intervention
- Superficial geology
- Alluvium
 - Black Park Gravel Member
 - Boyn Hill Gravel Member
 - Head
 - Lynch Hill Gravel Member

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Plan of PQ Zone 20a

Figure 30



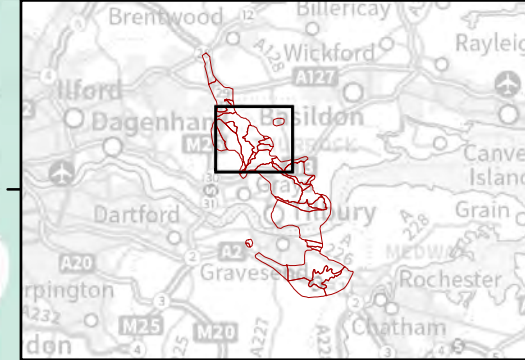
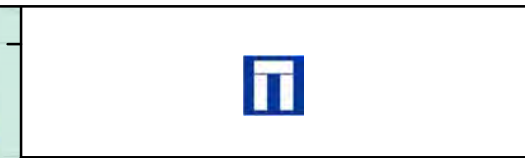
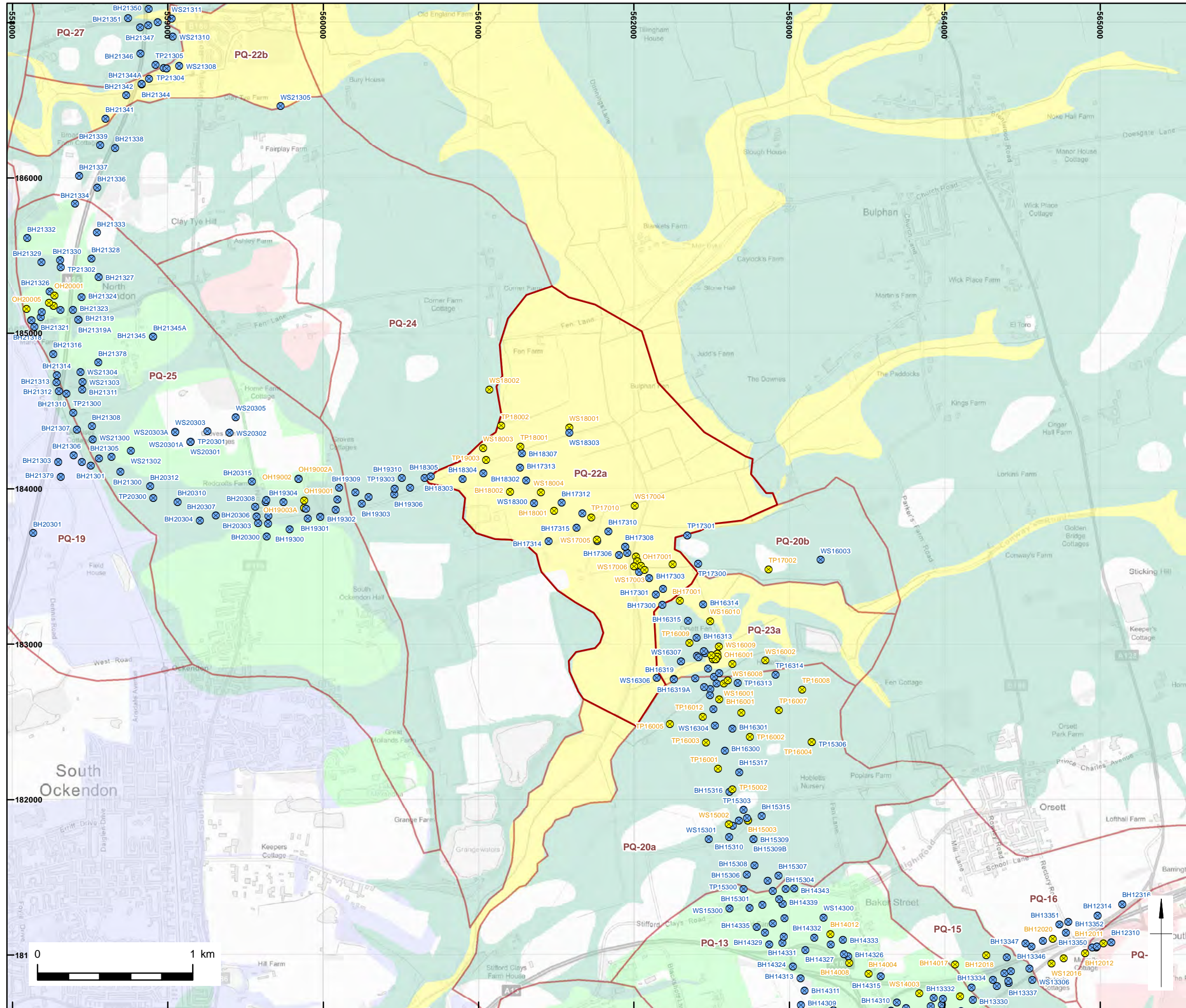
- PQ zone
 - Phase 2 GI intervention
 - Phase 3 GI intervention
- Superficial geology
- Alluvium
 - Head

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Plan of PQ Zone 20b

Figure 31



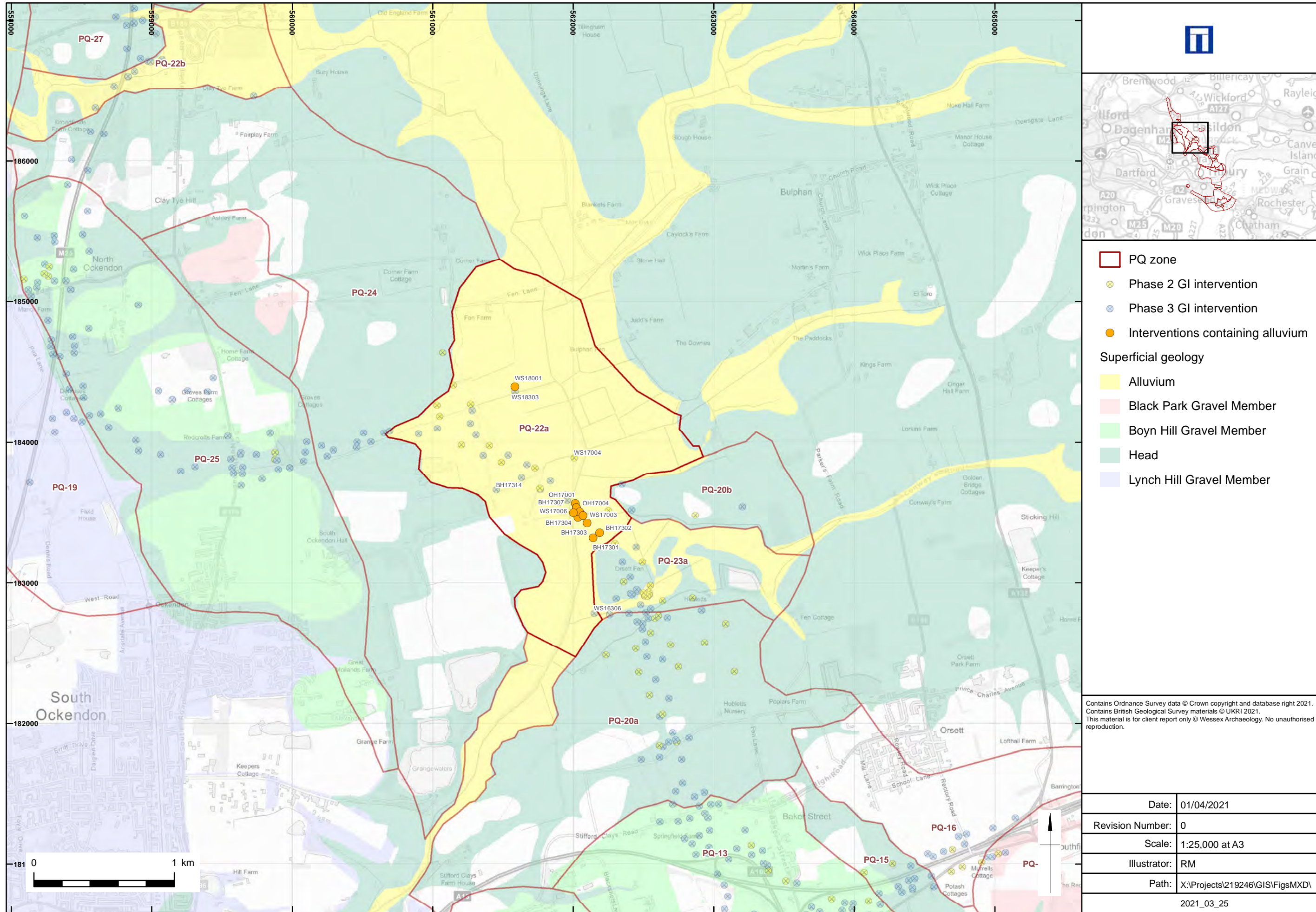
- PQ zone
- Phase 2 GI intervention
- Phase 3 GI intervention
- Superficial geology
- Alluvium
- Black Park Gravel Member
- Boyn Hill Gravel Member
- Head
- Lynch Hill Gravel Member

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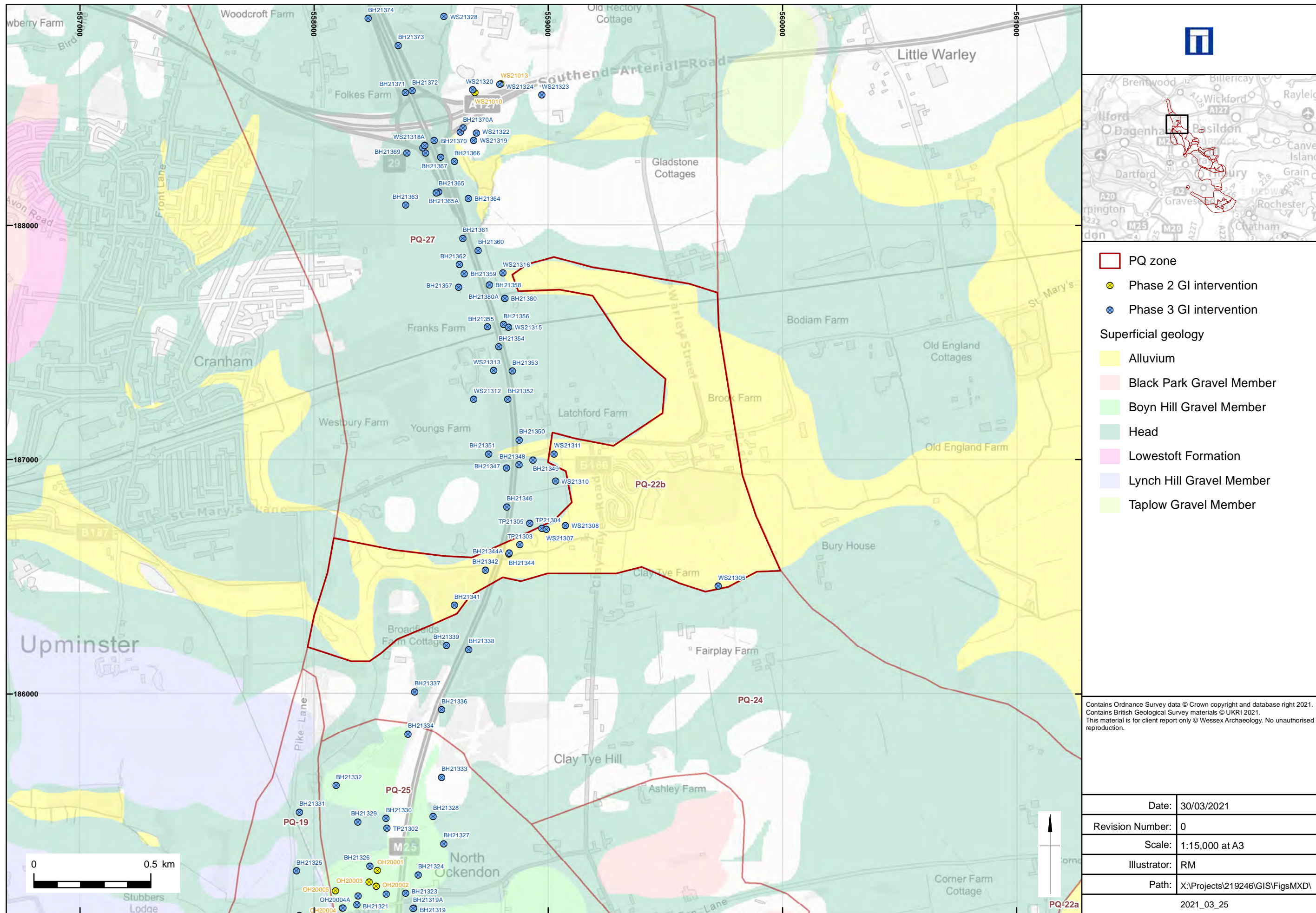
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Plan of PQ Zone 22a

Figure 32

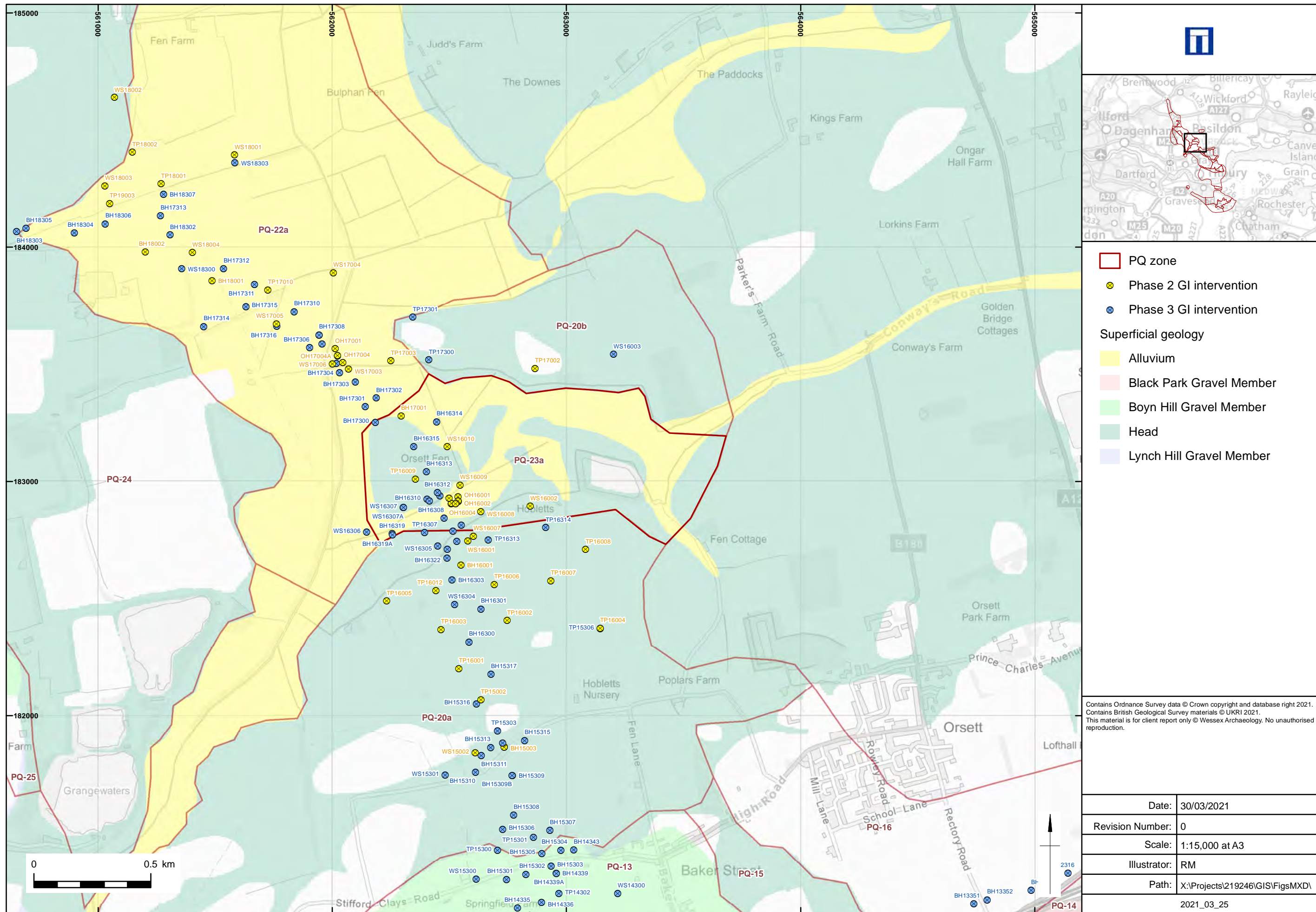


Plan of PQ Zone 22a showing interventions containing alluvium



Plan of PQ Zone 22b

Figure 34

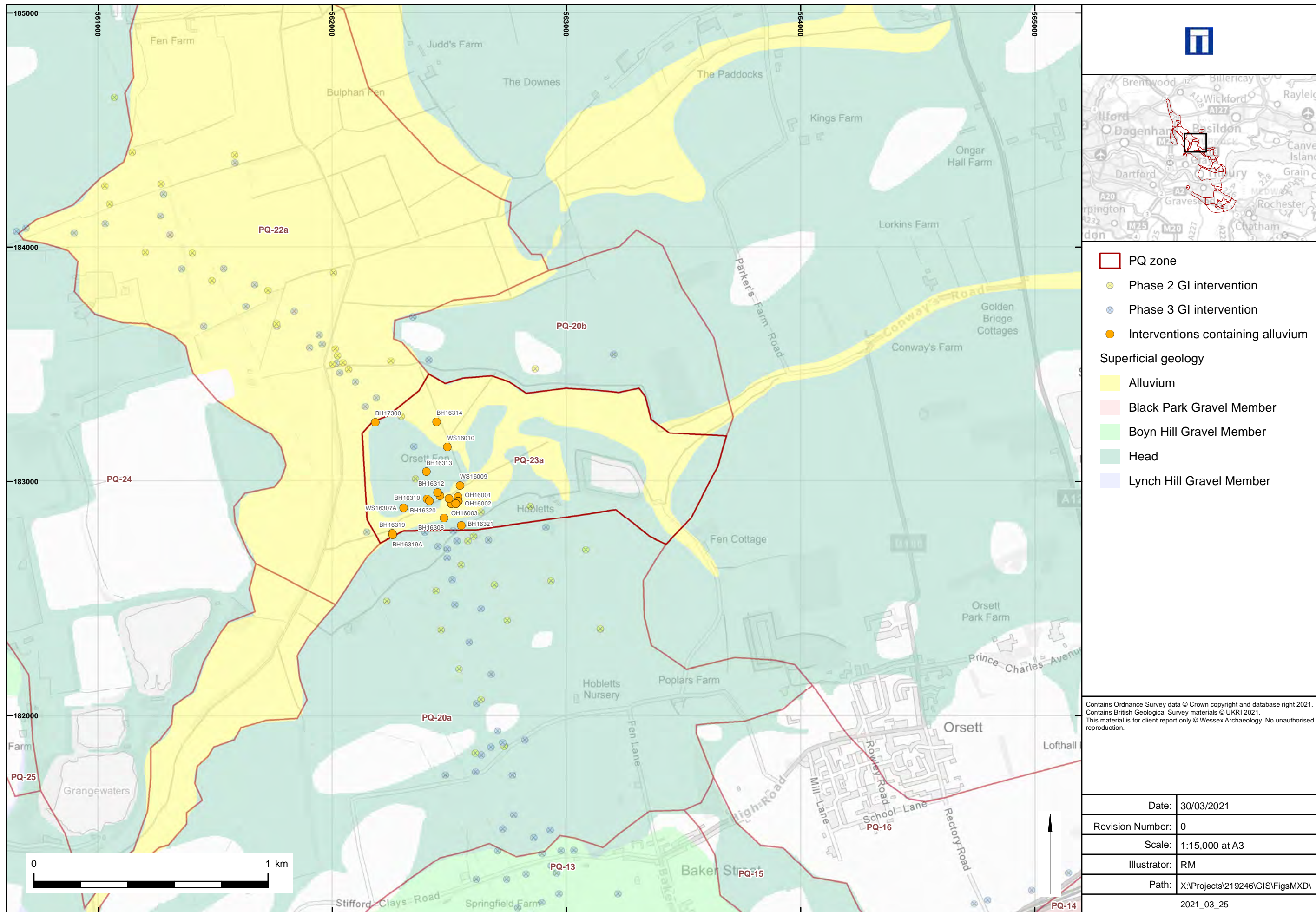


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Plan of PQ Zone 23a

Figure 35

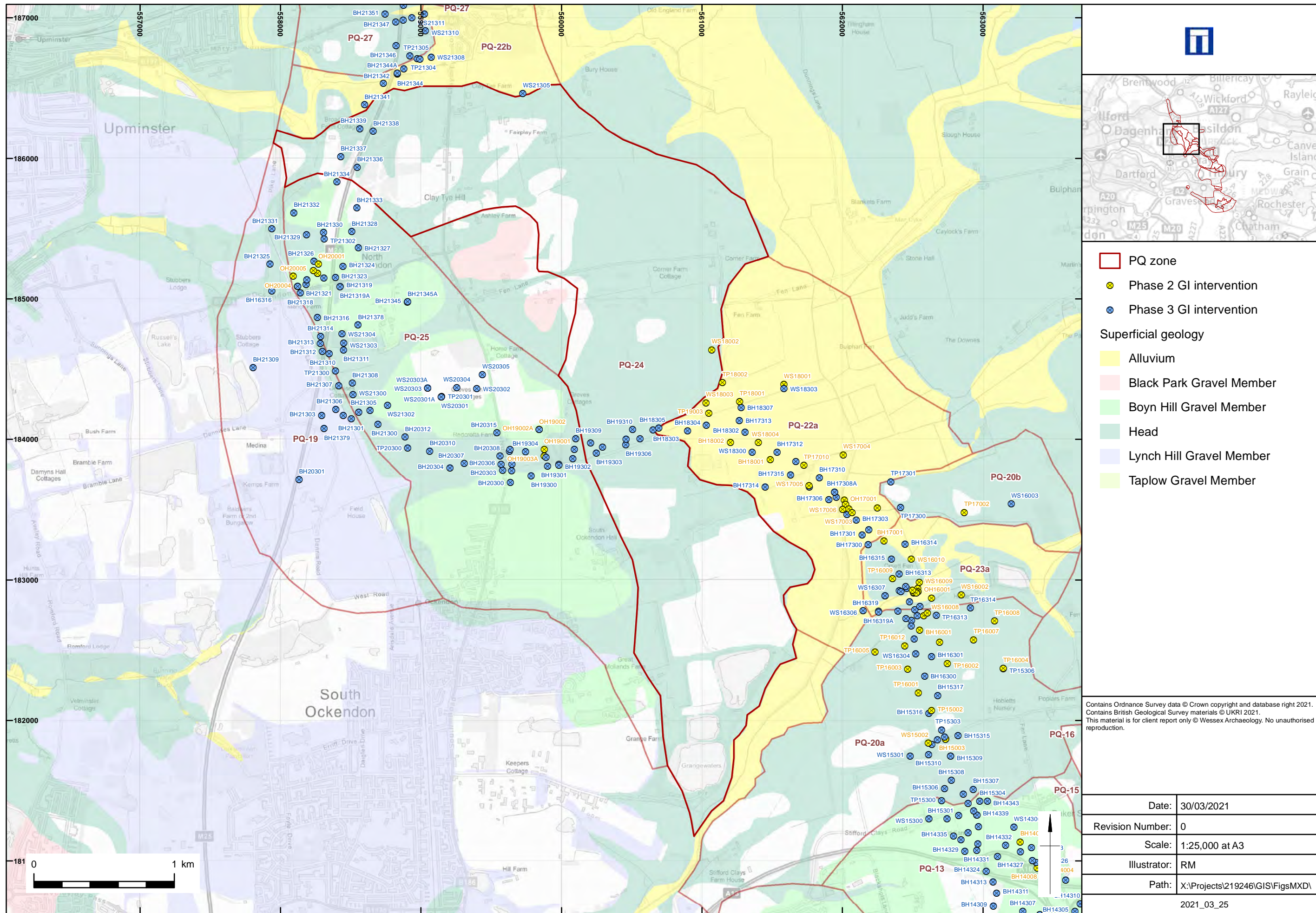


- PQ zone
 - Phase 2 GI intervention
 - Phase 3 GI intervention
 - Interventions containing alluvium
- Superficial geology
- Alluvium
 - Black Park Gravel Member
 - Boyn Hill Gravel Member
 - Head
 - Lynch Hill Gravel Member

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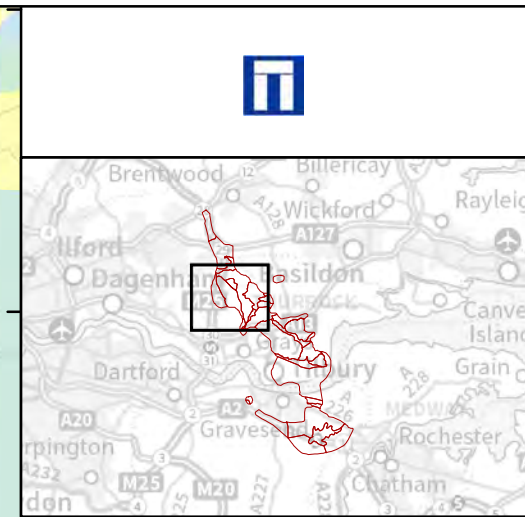
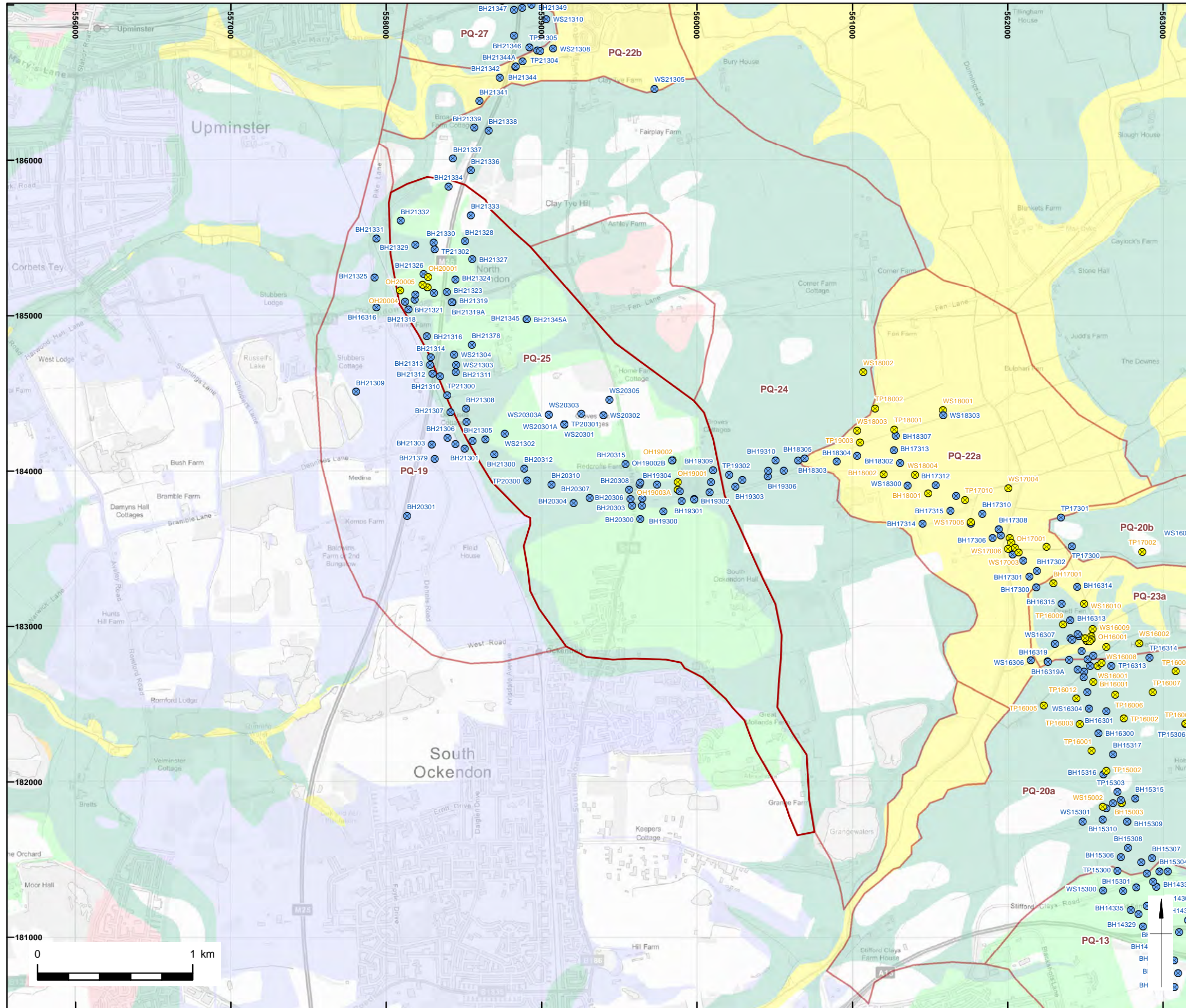
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Plan of PQ Zone 23a showing interventions containing alluvium



Plan of PQ Zone 24

Figure 37



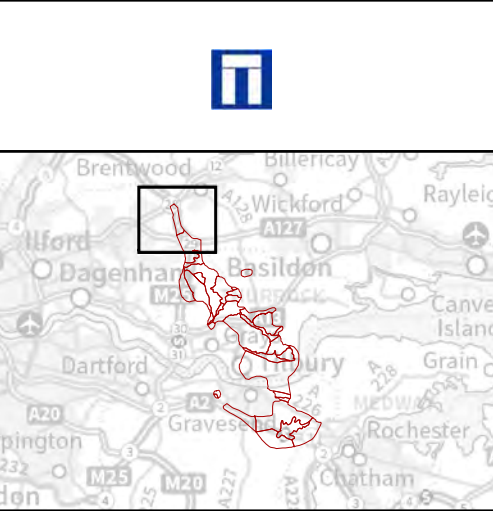
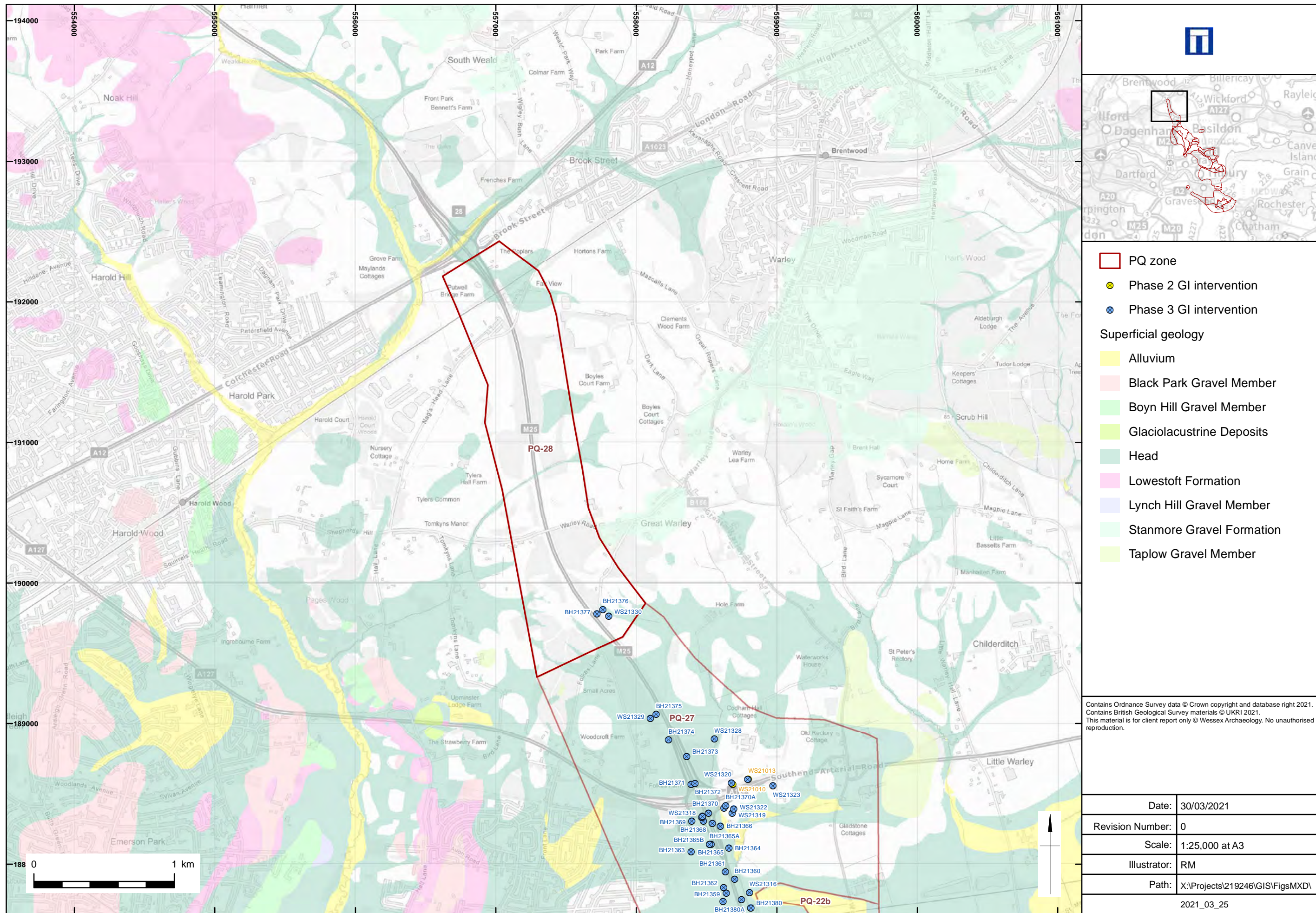
- PQ zone
 - Phase 2 GI intervention
 - Phase 3 GI intervention
- Superficial geology
- Alluvium
 - Black Park Gravel Member
 - Boyn Hill Gravel Member
 - Hackney Gravel Member
 - Head
 - Lynch Hill Gravel Member
 - River Terrace Deposits
 - Taplow Gravel Member

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Plan of PQ Zone 25

Figure 38



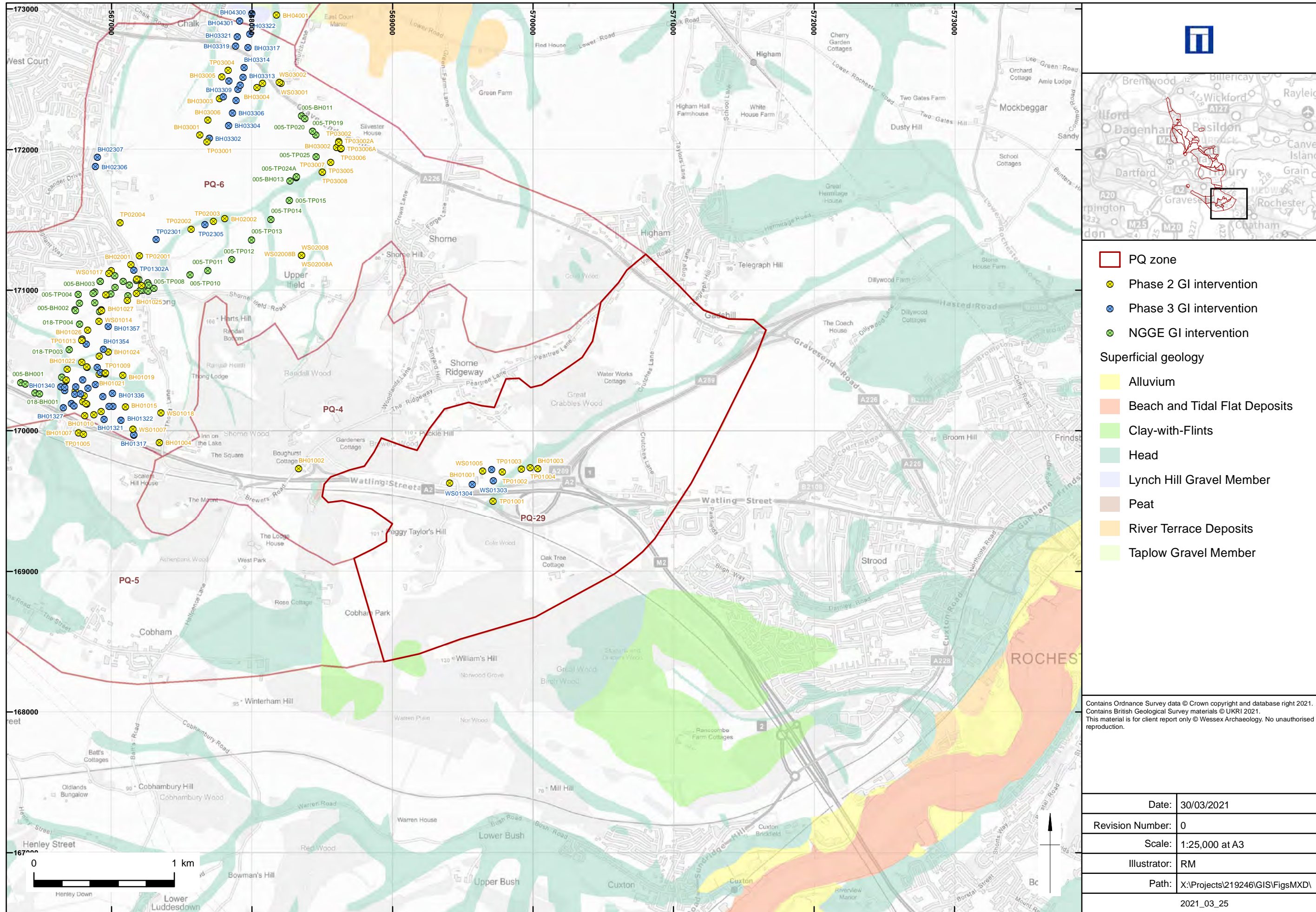
- PQ zone
 - Phase 2 GI intervention
 - Phase 3 GI intervention
- Superficial geology
- Alluvium
 - Black Park Gravel Member
 - Boyn Hill Gravel Member
 - Glaciolacustrine Deposits
 - Head
 - Lowestoft Formation
 - Lynch Hill Gravel Member
 - Stanmore Gravel Formation
 - Taplow Gravel Member

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Plan of PQ Zone 28

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Plan of PQ Zone 29

Figure 41

